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TENTH ANNIVERSARY YEAR 1956

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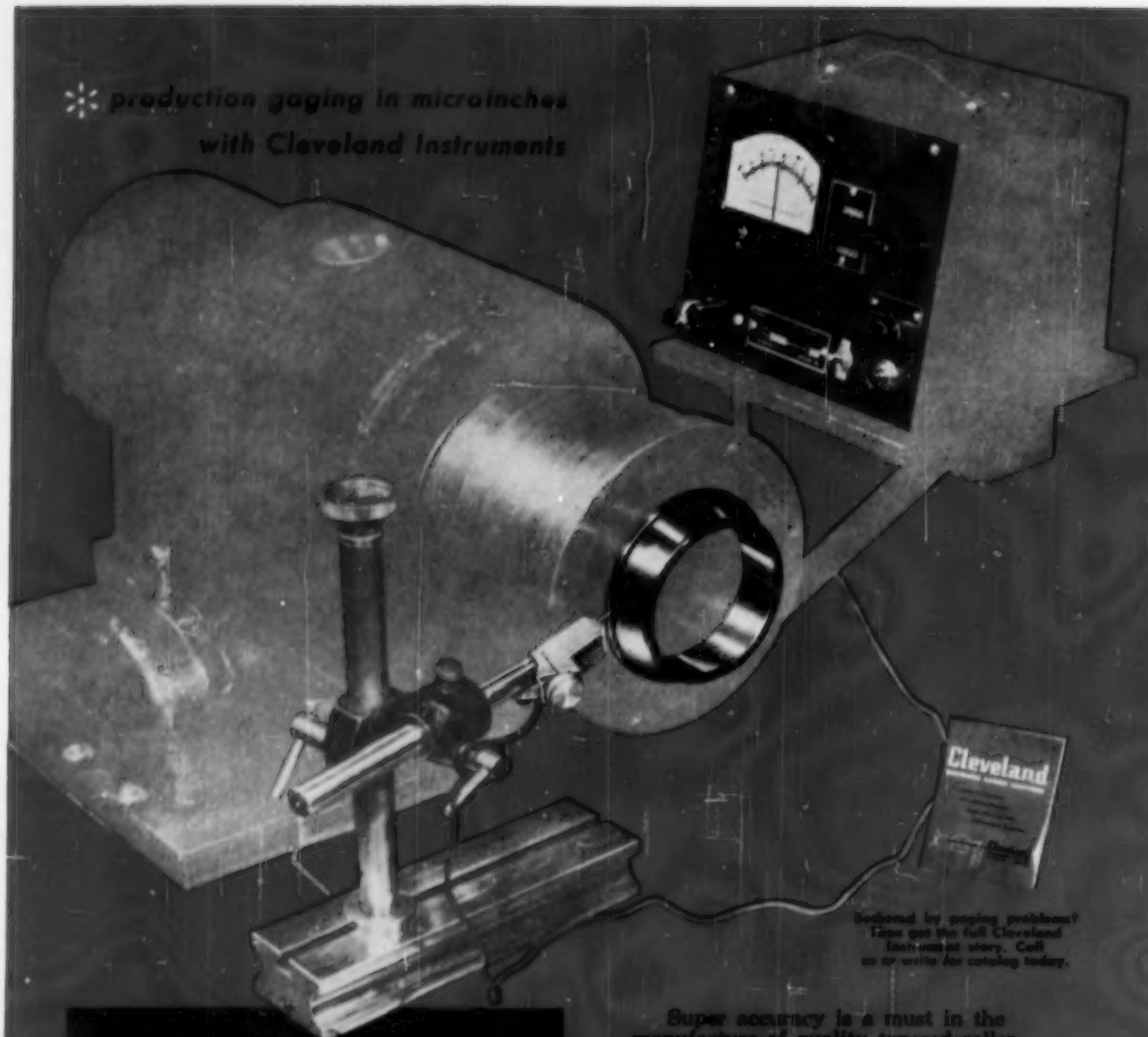

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A Quality Control Chart For The Weather

F. W. PRESTON

Preston Laboratories, Butler, Pa.

The weather in most parts of the world is well known to be hotter in summer than in winter: it is not so well known, though it has not entirely escaped notice, that, in some regions at least, it is far more variable in winter than in summer. The account that follows relates specifically to the area around Pittsburgh, but similar results would probably be obtained over much of North America, with a change in numerical constants.

We are here defining the "weather" in terms of the *average* daily temperature. The U. S. Weather Bureau at the Pittsburgh Airport (elevation 1120 feet) takes the temperature every hour, notes the maximum and minimum temperatures reached, and reports the mean of these two observations as the average temperature for the day. This is the figure under discussion in what follows.

The weather is just about one month "out of phase" with the sun. The sun is at the lowest in the sky on December 21st, but the coldest weather, on the whole, does not come until about January 21st. The sun is at its highest on June 21st, but the hottest weather tends to come about July 21st. The average temperature in our region is about 52 degrees F., averaged over the whole year. This is the temperature of the groundwater, and most spring-water is close to this. The sun is at its average height when it crosses the equator on March 21st, but the countryside does not reach average temperature, 52 degrees F., until about April 20th.

If the earth went around the sun in a perfect circle, the sun's height at noon would follow a simple "sine" curve with a period of one year. The error introduced by the fact that the earth travels in an ellipse rather than a circle is not very important. It seems that the average temperature of the day, plotted against the seasons, gives a simple sine curve, nearly enough, which may be expressed by the equation

$$T_{av} = 52.5 + 22.0 \sin 30m \quad (1)$$

where m is the number of months past the "zero hour" or "zero day". Here the "zero hour" is not the spring equinox (March 21st) but April 20th, whereas the zero hour for the sun's altitude at noon would be March 21st.

This equation makes the hottest weather, in late July, give a daily average of 74.5 degrees F. This is not the highest temperature of the day, but the average as defined above, and averaged not for one day, but for the same day over many years.

Similarly, the equation makes the coldest weather, in late January, average 30.5 degrees F., only 1½ degrees below freezing. This does not prevent the thermometer from dropping, some nights, to zero or lower, nor prevent January 21st or some other winter day in a particular year from averaging much lower than 30 degrees F.

The "30m" is to be understood, of course, as being so many angular degrees, so that sin 30m can be looked up in a table of trigonometric functions.

If now we observe the temperature year after year on a particular day, say June 1st, we shall probably get a different temperature each year. With enough observations we can calculate therefrom a "standard deviation" for that date or for any date. We then find that the standard deviation is roughly twice as great in winter (say December 1st) as it is in summer (say June 1st). In fact, in winter it is approximately ±10 degrees F., and in summer it is roughly ±5 degrees F. Further, it appears that the standard deviation tends to follow a sinusoidal curve, but this curve is 180 degrees "out of phase" with the temperature, so that the higher the temperature the lower the standard deviation.

For the purposes of this article we found that a fair approximation (not necessarily the best) was

Standard Deviation,

$$\pm \sigma = 7.65 - 2.75 \sin 30m \quad (2)$$

where m has the same meaning as in equation (1).

Now in industrial operations there are men, and women, keeping "control charts" on all sorts of measurements. These "quality control" people know what the average quality, or weight, or size, or strength, of their product ought to be, and they know on the basis of experience with it how much scatter they ought to expect. So they work with a chart on which they have three horizontal lines. The middle one gives the average quality; the other two give "limits," perhaps 2 σ or 3 σ limits, outside of which they do not expect to see many plotted points fall. If they do, they lift their eyebrows.

In the case of the weather the three lines are not horizontal straight lines, but wave-forms or sine curves, oscillating upwards in summer and downwards in winter. But they don't all oscillate by the same amount, since the "standard deviation" varies with the season, as we have shown. So the upper limit oscillates less violently than the lower.

For our curves we have taken the 2 σ limits, which means that roughly one observation in 20 will probably lie outside the limits and 19 out of 20 will fall inside them. Since the weather goes in cycles of several days' duration, people accustomed to quality control work may feel that the plot of average daily temperatures (see Fig. 2) in any one year will look rather queer, and not like the control charts with which they are familiar. They may even say that the weather is normally and systematically "out of control," which is true both in their technical sense and in the sense that laymen would understand it. Nonetheless, this general picture of the kind of weather we have may not be uninteresting.

Writing our equations as follows,

$$T_{av} = 52.5 + 22.0 \sin 30m$$
$$2\sigma = 15.3 - 5.5 \sin 30m$$

and adding and subtracting, we have

$$T_{av} + 2\sigma = 67.8 + 16.5 \sin 30m$$
$$T_{av} - 2\sigma = 37.2 + 27.5 \sin 30m$$

which are the equations of the two broken lines. These lines will be transgressed only once in about 20 observations. Putting sin 30m = 1, we get as the maximum average daily temperature 84.3 degrees F., not often to be exceeded, and putting sin 30m = −1 (the other extreme limit) we get a minimum average daily

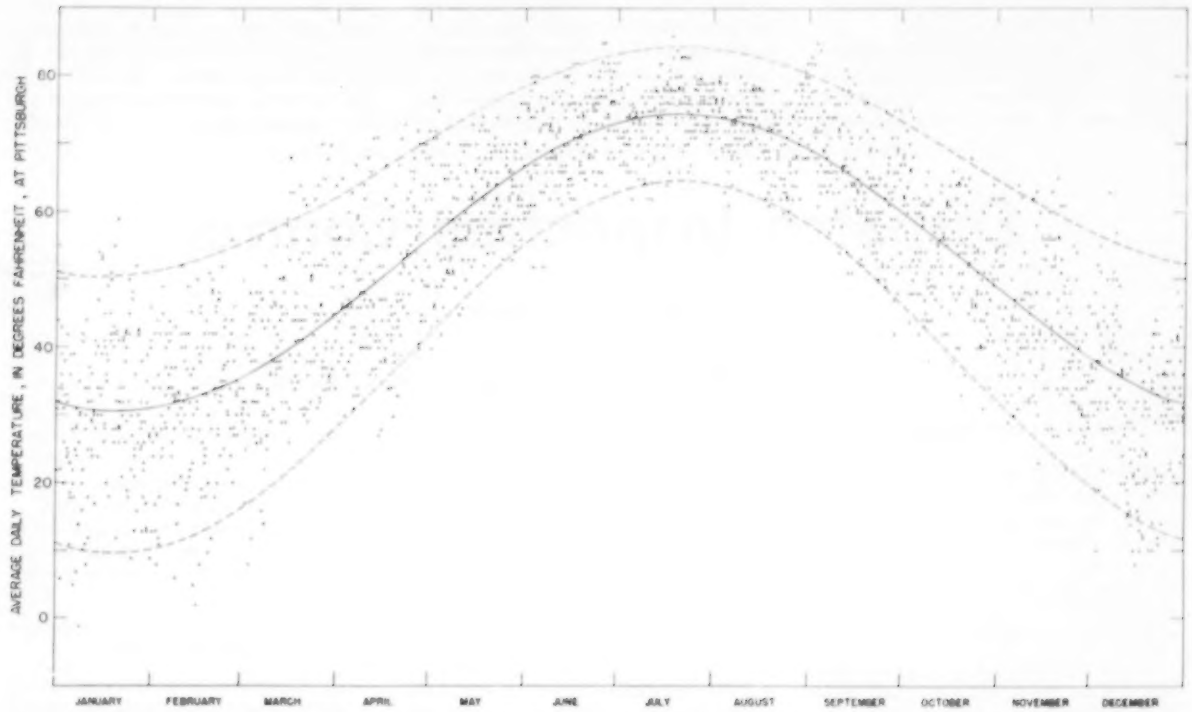

Figure 1—Control Chart for Average Daily Temperatures over the Six Years 1942-43-45-51-52-53. (Data from U. S. Weather Bureau at the Pittsburgh, Pa., Airport.)

temperature of 9.7 degrees F., also rarely to be beaten.

Figure 1 shows a large number of spots representing average daily temperatures for six years (1942, 43, 45, 51, 52, 53) and therefore contains about 2200 spots. Of these 73 fall above the upper line and 75 below the lower line, a total of 148, or about one in 15. A very slight increase in our estimate of sigma would place the upper and lower control limits

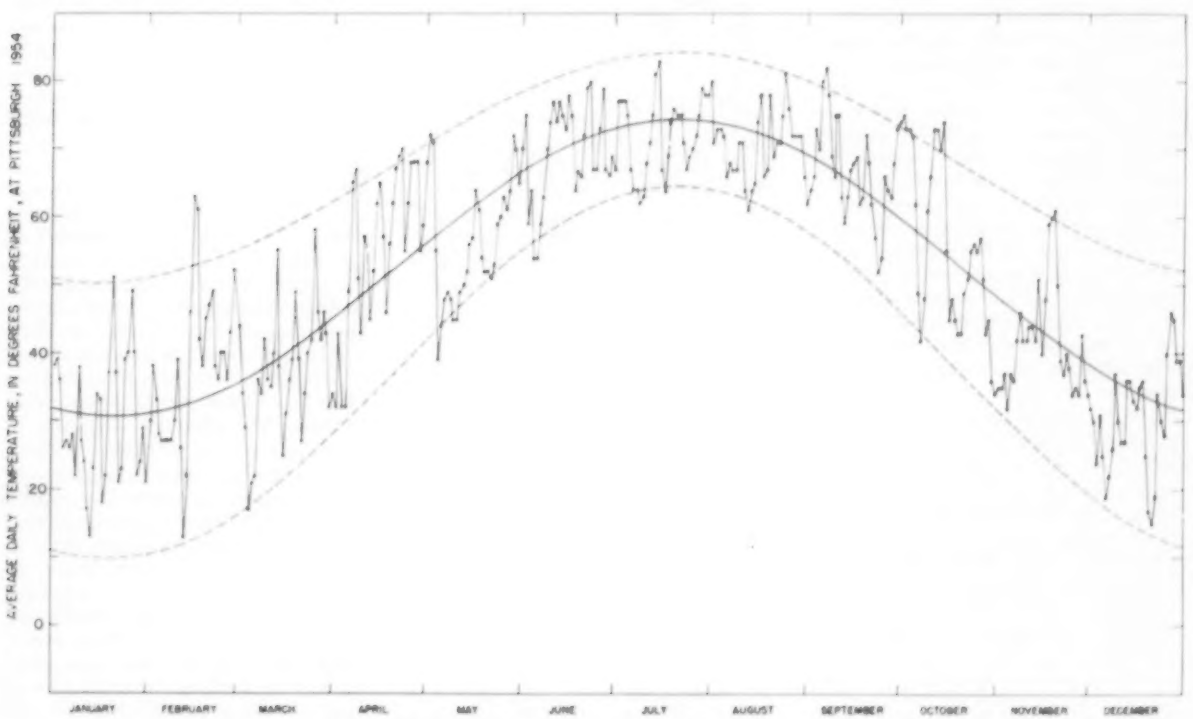

Figure 2—Variation in Average Daily Temperatures for 1954, Pittsburgh Airport. (Control Limits based on the data of Fig. 1.)

where only 110 spots, or one in 20, would transgress the limits.

Figure 2 shows the same control limits, and on it, zigzagging back and forth, and usually staying within the limits, are the day-by-day plottings of the average daily temperatures for the year 1954. Note that this period is not one of the years used in establishing the control limits. We may, therefore, feel some confidence that we have established a definition of the weather, so far at least as average daily temperature is concerned, in terms of a "control chart." In some respects it may be more useful, certainly more graphic, than the data usually given.

Dispatch Inspection Control*

JOHN M. SHELDON

Montrose Div., Bendix Aviation Corp., South Montrose, Pa.

Problems and Objectives

Before going into the general details of the dispatch inspection control system used at the Montrose Division, it might be well to summarize briefly the general problems faced by the division and the objectives which we had in mind before organizing our system.

First, we were not completely satisfied with the system we had been using. The floor or process inspection was not adequate for controlling the products at a quality level to assure economical as well as efficient manufacturing. Also, the control of labor costs was not entirely satisfactory, and production control of material in process left a great deal to be desired.

We were faced with the introduction of the incentive payment plan for the production workers. It was recognized that putting into effect incentive payment for productive workers often brings with it the problem of proper controls. In particular, it was necessary to control the quality as well as the quantity of parts for which the operators would be paid. It was believed necessary to maintain a more vigilant in-process control in order that the manufacturing worker did not jeopardize the incentive plan by merely making parts without regard to their quality.

It was also recognized that the floor or process patrol inspection which we had in effect was not the most effective or efficient method of controlling manufacturing processes. Some of the reasons were fairly obvious for this ineffectiveness of floor-process inspection control. The inspector himself was under the influence of manufacturing personnel more than inspection supervision. As a floor or process inspector made his rounds, he might have to contend with the manufacturing operator, the set-up man, and the manufacturing foreman in discussing the quality of any job in question, with the result that quality standards often came out second best, that is, unless the inspector was one with an extremely stubborn temperament, and the courage of his own conviction.

Secondly, it was difficult to determine the exact amount of inspection a floor or process inspector might do —the amount varying with what the inspector "had for breakfast," or his personal inclination for the day.

Lastly, the operators themselves tended to do little or no inspection of their work, depending entirely upon the floor or process inspector for all inspection done on the product.

Another problem which was always present was the production control of materials and processes. Very often material got lost, and in the pressure of operations, new lots were started with the result that additional expediting was required in order to keep the parts schedule on time. Reworkable material was bypassed, and inventory control and turnover became a real problem.

Manufacturing sections wanted to pinpoint daily indirect labor charges for more effective control by the shop supervision. The problem of operators' control of incentive earnings by manipulation of tool trouble charges, set-ups and other daywork charges arose.

Another thing we wanted to accomplish at Montrose was the reduction of the number of production expeditors required.

In designing a system, we felt that the basic control of quality rested with the manufacturing personnel, and primarily the system was designed to place this responsibility upon them. Secondly, we were going to pay incentive earnings on acceptable material only; third, we wished to prevent count discrepancies from creeping into incentive payments.

The material flow needed to be kept in control, and, if possible, the scrap and rework charges reduced.

A Solution: the Dispatch Inspection Control System

In answering the above problems and arriving at the objectives stated, it might seem at first that we were attempting to reach for the moon, and, at times in our planning, it seemed as though this was exactly what we had attempted. We did, however, establish a dispatch inspection crib control in all of our manufacturing and assembly areas.

Before going into the methods employed, it should be stated that the problems involved in effectively placing this system into existence were overcome by the complete, (and it cannot be overemphasized) whole-hearted cooperation of all departments involved—manufacturing, inspection, time study, payroll, material control and expediting departments. The problem was accepted as one which faced the entire plant; not one which the inspection and quality control departments need solve alone, as all departments stood to benefit from the desired objectives of the system. It was necessary at times to compromise as to the most efficient and effective methods of reaching our desired goal.

Basically, the crib inspection dispatch system, as referred to in this article, means the routing of all material, after each operation, through a dispatch inspection crib. There the material is checked by inspection and dispatched to the succeeding operation. Inspection records are maintained on all parts after each operation, and production, material and cost records are maintained on the same basis.

*Presented at the Annual Joint Conference of the Washington-Baltimore Sections of ASQC at the University of Maryland, Nov. 19, 1954.

It was necessary to locate the inspection dispatch cribs fairly close to the manufacturing areas which they serviced. These crib areas had to be large enough to handle adequately the storage of materials and parts in the departments serviced, as only material upon which work is being performed or machines are being set up is in the manufacturing area itself.

This work is released by the manufacturing foreman to the machine from the dispatch area. A master card for each job is kept by the dispatcher showing the location of the material; that is, either at a machine operation or held in the crib area waiting for a machine operation.

Incentive Earnings

Another item considered was the incorporation in the time studies for incentive payment of inspection allowance for each operation. In other words, each operator was allowed a pre-determined time on his operation for inspection of the parts produced by his machine. These inspection allowances varied, but were kept fairly much in line with the machine capacity itself and with the nature of the operation. More critical operations on a part were allowed more time for inspection, and the less critical operations were allowed less inspection time.

It might be well to state here that these inspection allowances very often were obtained during machine time when the operator had free time. All manufacturing operators work on a "layout sheet" or "manufacturing data sheet." This sheet contains in detail all information required for the performance of the operation, including all tooling, equipment, and necessary gages to check the work. As the operator makes his set-up on the part, the first piece is inspected by the set-up man and manufacturing foreman for their approval. Upon obtaining this approval from these two persons, it is then submitted to the inspection department for an inspection first-piece check. This check is primarily to determine whether the tools used in the operation are such that a part can be expected to be within the tolerance limits specified. It is then up to the operator to inspect his pieces as they are manufactured to determine their conformance to the specification requirements.

As an aid to manufacturing, quality control has set up $\bar{X}$, R charts and other aids on selected jobs in order to assist the production worker in maintaining control of the operation. These charts are maintained by production workers themselves and are set up only upon requests from production for their installation.

At a maximum of every two hours, or at shorter intervals, depending upon the quantity of work being produced (and other factors), the operator either brings or sends his work, properly identified, to the inspection dispatch crib for the inspector's check. The inspector samples the operator's work — the sample plan used being taken from MIL-STD-105A. The inspector is allowed two hours after submission of a lot from manufacturing for his check. The work is accepted or rejected, based upon the result of the sample taken.

If the sample shows defectives beyond acceptable limits, the entire lot of work is returned to the operator properly identified, stating the type of defect found by the inspector, and is left with the operator to either screen or rework the material, as the case may be.

It should be pointed out that this is one of the items around which this system works effectively. The operator is not paid incentive earnings for any work in the defective lots until such time as the entire lot has been submitted to the dispatch station with a quality high enough to be acceptable by the sampling plan. Only after the material has been accepted by the inspector in the dispatch crib is it forwarded to the dispatch clerk who counts the material and enters the proper figure to the operator's time card for credit.

Detailed inspection routines have been made out for each part on each operation, so that the amount of inspection and characteristics to be inspected are available to the inspector.

This procedure is being used effectively on the line production basis as well as on the job-shop operations. In the group or line incentive payment plan, a group of people work together as a unit, submitting at the end of a group of operations, a part or an assembly, to the inspector for his check. The pattern here is the same as with the individual worker —the inspector samples the work, and either accepts or rejects it, based on his sample results. Should the work come to the inspector defective, it is returned to the line for screening and re-operation.

Better Records

Daily statistical records are kept in each dispatch area on the percentage of lots found defective the preceding day in the departments covered by that inspection station. These charts are posted by quality control analysts on a day-to-day basis, and are hung prominently in each department in order that everyone may know the percentage of lots defective from that department on the preceding day.

Daily reports are also made to manufacturing department supervisors on selected items, listing in detail the defects found, the operators responsible, and other pertinent information. The pre-selected items are based on previous experience with high scrap or high rework items.

Daily reports are also issued in some cases on operator's performance on special jobs. The important thing to remember is that individual records by part, by operation and by operator are available on a daily basis, and investigations into excessive scrap or other items can be started the succeeding day.

Effective Production Control

Another important feature of the system (and perhaps the most important to management), is the production control gained over the material in process. The point-by-point control of the movement of parts is no longer left to memory or guesswork. Material may be pin-pointed at any time during its process.

The system enables shop supervision to maintain a more effective control over indirect labor charges, department by department.

We also prevent operator-manipulation of incentive earnings, as the operators have no control over their daily job cards, all time keeping and crediting of incentive earnings being done by the dispatch clerk in the dispatch area. For our plant, it provides more effective inventory and production control of materials.

In the past six months of operation, as compared to the previous six months prior to the installation of the system, the manufacturing losses, errors and defects have been reduced 30 percent, and the inspection costs have been reduced 20 percent. The reduction of manufacturing losses is not entirely due to the installation of this system, but it would be a grave error to discount its effect. However, the reduced inspection costs are primarily, if not entirely, a result of its installation and use.

It was not accomplished overnight, nor were all of the details of the system instituted at one time. We started with an idea which was expanded as we progressed. The secret is the whole-hearted cooperation of the entire management staff working toward a single goal—a better product at a lower cost.

An Analysis of Variance

WILLIAM DOWELL BATEN*

The analysis explained in this article involves lengths of steel bars which were made from two heat treatments and cut on four screw machines at three times—8:00 am, 11:00 am, and 3:00 pm. The supervisor was interested in knowing whether or not heat treatments led to longer or shorter bars, whether or not the machines were performing about alike and if different lengths were results of the times at which they were cut. The time element involved fatigue on the part of the operators.

After a quantity of bars was produced, it was found, by use of control charts and a frequency distribution, that too many of them did not meet specifications as prescribed by engineers in the plant. Many had to be recut or put into scrap. The four screw machines had been purchased rather recently and were supposed to be capable of turning out material that met requirements. Suggestions were made as to fatigue of the operators as they worked during their shift.

After trying to find assignable causes for so many bars being out of control limits when they were made from both heats on the four machines, it was decided to carry out an experiment, the results of which would show differences, if any, due to heats, machines, times, and interactions between them.

It was decided to measure the lengths of four bars three times of day from each of the machines for the two heats. This meant that measurements of 96 bars were to be made. In many experiments 96 determinations are sufficient to detect real differences if they exist. The desired length of the bar was 4.385 ± 0.005 inches. The measurements less 4.380×1000 are given in Table I.

TABLE I—Lengths of Steel Bars

	Heat Treatment W					Heat Treatment L				
	Machines					Machines				
Time	A	B	C	D	Ave.	A	B	C	D	Ave.
1	6 9 1 3	7 9 5 5	1 2 0 4	6 6 7 3		4 6 0 1	6 5 3 4	−1 0 0 1	4 5 5 4	
Ave.	4.8	6.5	1.8	5.5	4.6	2.8	4.5	0.0	4.5	2.9
2	6 3 1 −1	8 7 4 8	3 2 1 0	7 9 11 6		3 1 1 −2	6 4 1 3	2 0 −1 1	9 4 6 3	
Ave.	2.6	6.8	1.5	8.3	4.7	0.8	3.5	0.5	5.5	2.6
3	5 4 9 6	10 11 6 4	−1 2 6 1	10 5 4 8		6 0 3 7	8 7 10 0	0 −2 4 −4	4 3 7 0	
Ave.	6.0	7.8	2.0	6.8	5.6	4.0	6.3	−0.5	3.5	3.3
Grand Ave.	4.3	7.0	1.7	6.8	5.0	2.4	4.7	0.0	4.5	2.9 4.0

On examining this table, it is seen that bars made from the heat treatments had different averages, that machine C for both heats produced shorter bars than the others and that there were very little differences between the averages for the three times at which the samples were made. There were considerable variations among the lengths of the bars cut by the operators. Questions arose concerning whether these differences were significant or whether they were just due to chance variations in random sampling. These questions were answered by an analysis of variance of these data, which is given in Table II and Table III, the calculations are given in the Appendix.

Since there were no significant interaction mean squares and the mean square for time was not significant, the sums of squares pertaining to them were combined with the error sum of squares to form a new error mean square. Since the analysis indicated no real differences between the time averages, the data consisted of 12 bars from each machine and heat. The new analysis of variance is shown in Table III.

The two asterisks in Table III mean that the heat treatment averages are significantly different and that at least two of the machine averages are also significantly different. According to Tukey's[1] method, the mean for machine C is significantly less than the averages of the other machines and the mean of machine A is significantly less than the means of machines B and D. With this information adjustments of the machines had to be made. According to Duncan[2] the following table enables one to test every pair of means.

TABLE II—Analysis of Variance of Lengths of Steel Bars

Source of Variation	D.F.	SS	M.Sq.
Total	95	1038	
Between heat treatment averages	1	100	100.0**
Between machine averages	3	394	131.3**
Between time averages	2	13	6.5
Interaction—H × M	3	1	0.3
Interaction—H × T	2	2	1.0
Interaction—M × T	6	71	11.8
Interaction—H × M × T	6	10	1.7
Error	72	447	6.2

TABLE III—Analysis of Variance of Lengths of Steel Bars

Source of Variation	D.F.	SS	M.Sq.
Total	95	1038	
Between heat averages	1	100	100**
Between machine averages	3	394	131**
Error	91	544	6

TABLE IV—Worksheet

(a) Shortest Significant Ranges $\sigma_m = \sqrt{6/24} = 0.5$

p :	(2)	(3)	(4)	[From Table 2 of reference (3)]
R_p :	2.80	2.95	3.05	
$R_p \times \sigma_m$:	1.40	1.48	1.53	

(b) Results

Machines	C	A	D	B
Averages	0.9	3.4	5.7	5.9

The line under D and B in table IV indicates that they are not significantly different.

The tests for the various pairs of averages are as follows:

$B - C = 5.0 > 1.53$; thus $B - C$ is significant.

$B - A = 2.5 > 1.48$; thus $B - A$ is significant.

$B - D = 0.2 < 1.40$; thus $B - D$ is not significant.

*Agricultural Experiment Station Statistician and Professor of Mathemattics, Michigan State College, East Lansing, Michigan. Journal Article 1767 from the Michigan Agricultural Experiment Station.

Applied to Screw Machines

Michigan State University, East Lansing, Michigan

$D - C = 4.8 > 1.48$; thus D − C is significant.

$D - A = 2.3 > 1.40$; thus D − A is significant.

$A - C = 2.5 > 1.40$; thus A − C is significant.

Appendix

The fundamental identity for this three classification design is,

(1) Total SS = heat SS + machine SS + time SS + interaction heat × machine SS + interaction heat × time SS + interaction machine × time SS + interaction heat × machine × time SS + error SS

where SS represents sum of squares.

Let x_i represent the ith value in Table I. The total SS for this table is

$$\text{Total SS} = \Sigma (x_i - \bar{x})^2 = \Sigma x_i^2 - (\Sigma x_i)^2/96 = \Sigma x_i^2 - \text{C. T.} = 2542 - 1504 = 1038,$$

where C. T. represents the correction term.

The sum of squares due to heats, machines and the interaction of heats × machine is obtained from Table V, which is a two-way table for heats and machines.

The values in Table V are the sums of the measurements in Table I, which pertain to the particular cells. The value 52 in the upper left-hand cell was found by adding all of the measurements of bars that were cut on machine A for heat treatment W. The y-values represent totals for the cells. The number in parentheses (12) in the first cell means that the number of measurements that made up the value 52 was 12. The total 239 for heat W was obtained from 48 values, etc. The first cell value is equal to $6 + 9 + 1 + 3 + 6 + 3 + 1 - 1 + 5 + 4 + 9 + 6 = 52$. Other values were similarly found. The numbers in parentheses are important because they enable one to know the proper denominators to use when computing sums of squares. The total sum of squares for Table V is

$$\Sigma y^2/12 - \text{C. T.} = 1999 - 1504 = 495$$

The sum of squares due to the difference between heat treatment averages is

$$\Sigma h_i^2/48 - \text{C. T.} = 1605 - \text{C. T.} = 100.$$

The sum of squares due to the differences between machine averages is

$$\Sigma m_i^2/24 - \text{C. T.} = 1898 - \text{C. T.} = 394.$$

The sum of squares due to the interaction of heats × machines is found by subtracting from the total SS for Table V, the heat SS and the machine SS and is equal to

$$\text{heats} \times \text{machines SS} = 495 - 100 - 394 = 1.$$

The other sums of squares in Table II were found from two-way tables similar to Table V.

The second order interaction heat × machine × time is found from Table VI, which is a three-way table for heats, machines and times.

The total sum of squares for Table VI is equal to

$$\Sigma z_i^2/4 - \text{C. T.} = 2095 - \text{C. T.} = 591$$

The interaction heat × machine × time SS is calculated by subtracting from the total SS for Table VI the sums of squares due to heats, machines, times, interaction heat × machine, interaction heat × time and interaction machine × time and is

Interaction heat × machine × time $= 591 - 100 - 394 - 13 - 1 - 2 - 71 = 10$.

The error SS in Table II is found from equation (1) and is $1038 - 100 - 394 - 13 - 1 - 2 - 71 - 10 = 447$.

Mean squares in Table II are found by dividing the sums of squares by the respective numbers in the column headed by D.F. (degrees of freedom).

The standard deviation of the difference between any two machine averages taken at random is

$$\sigma(m_i - m_i) = \sqrt{2(6)/24} = 0.71,$$

and the difference between any two machine averages taken at random to be significant at the five percent level is

$$D = \text{difference} = 0.71 \times 1.99 = 1.4,$$

where the quantity 1.99 was found in a t-table at 91 degrees of freedom.

By K. R. Nair's [3] method of testing difference between the average of the four machines and the average of machine C, it is seen that the average of machine C is significantly smaller than the average of all of the machines.

References

(1) Notes of John Tukey, Princeton University, 1954. Tukey's tables are not available to the public yet.

(2) D. B. Duncan, "Multiple Range and Multiple F Tests," *Biometrics*, Vol. II, 1955, p. 1-42.

(3) K. R. Nair, "The Studentized Form of the Extreme Mean Square Test in the Analysis of Variance," *Biometrika*, Vol. XXXV, 1948, p. 16-31.

TABLE V

Heat	Machines A	B	C	D	Total	Ave.
W	(12) $y_1 = 52$	84	21	82	(48) $h_1 = 239$	5.0
L	30	57	0	54	$h_2 = 141$	2.9
Total	(24) $m_1 = 82$	$m_2 = 141$	$m_3 = 21$	$m_4 = 136$	380	
Ave.	3.4	5.9	0.9	5.7		

TABLE VI

	Machines A		B		C		D	
Time	W	L	W	L	W	L	W	L
1	(4) $19 = z_1$	11	26	18	7	0	22	18
2	9	3	27	14	6	2	33	22
3	24	16	31	25	8	−2	−2	14

Local Section News

". . . BUT NOT FORGOTTEN"

ALBUQUERQUE The Feb. 7 meeting was held in Mitchell Hall of the University of New Mexico. J. M. Wiesen, Sandia Corp., presented the educational session with a discussion of "Tolerances from stacked tolerances." P. H. Bircher, quality assurance department, Sandia Corp., presented a paper by Leslie W. Ball entitled "Management use of laboratory testing to achieve reliability" during the general meeting. R. O. Frantik of the reliability evaluation division, Sandia Corp., served as moderator during the discussion period which followed. The executive committee and committee chairmen held a dinner meeting prior to the formal meeting.

ALLENTOWN -BETHLEHEM Forty members and guests of the section enjoyed Dr. Mason E. Wescott's talk entitled "What's the difference" which was presented at the Feb. 8 meeting.

BIRMINGHAM Paul W. Runge, technical superintendent of Chemstrand Corp.'s nylon plant at Pensacola, Fla. was the speaker at the Feb. 9 meeting. Mr. Runge described how Chemstrand makes extensive use of statistical quality control techniques in its comprehensive quality control program, which covers the entire nylon operation. Chemstrand's Pensacola plant is the only completely integrated nylon plant in the country. It is operating at capacity of 50,000 pounds of nylon per year and is currently undergoing expansion to almost double this output.

BUFFALO Our February meeting was held in conjunction with the Technical Societies Council Forum held at the Hotel Statler. The highlight of the program was Dr. M. A. Brumbaugh's presentation of "An evaluation of statistical methods as a tool for management."

BUZZARDS BAY Shaw Goldthwait, quality control director of the Collyer Insulated Wire Co. in Pawtucket, R. I., was the principal speaker at the Feb. 8 meeting held in the Continental Screw Co., New Bedford. His subject was "Quality control techniques at Collyer." He demonstrated the use of control charts by the machine operator to evaluate the progress in decreasing defectives. The use of summary charts at foremen and management meetings as a measure of cost control over longer range periods was also shown.

A basic course in quality control was begun Feb. 14 under the sponsorship of the section. The sessions are being held at Berkshire Hathaway Inc., New Bedford, Mass. and consist of eight sessions.

CHICAGO At the Feb. 9 meeting of the introductory educational group, Robert L. Storer spoke on "Preparing a control program." He explained how to lay out a control plan for a production line or a fabricating department, also where to establish control points and what type of controls should be employed. His discussion of this very vital part of a well co-ordinated program proved to be of most interest to those still attempting to surmount the difficulties of establishing a paying control program. Approximately 75 members and guests left this meeting with a better knowledge of the do's and don'ts of establishing a control program.

On Feb. 15 the second of a group of plant tours arranged by the plant tour committee was held at the Zenith Radio and Television Corp. Mr. Krueger, head of their quality control division, and his staff conducted the tour of Zenith's assembly plant. Upon completion of the tour our group was Zenith's guests for "coffee and" during which time each guide answered questions asked by members of his group. On behalf of the 100 plus members of the group and the plant tour committee, a sincere thank you to Mr. Krueger and his company for an enjoyable afternoon and the cordial welcome extended to us.

At the do-it-yourself meeting on Feb. 22 Richard Ede, of the United States Steel Co. and a co-chairman of the do-it-yourself committee, presented a problem related to the fabricating of steel. After the discussion of possible solutions by the audience, Mr. Ede related the actual corrective measures that were to be taken to improve and stabilize the process.

CINCINNATI For our February meeting we joined with the other 23 member societies of the Technical and Scientific Societies Council of Cincinnati for a meeting held at the Wilson Auditorium on the University of Cincinnati campus on Feb. 22. This meeting is an annual affair held during National Engineer's Week; its purpose being to promote better public recognition of the achievements of engineering.

CINCINNATI Hamilton Subsection The regular meeting was held on Feb. 8 at the Pillsbury Mills Plant and the group enjoyed an excellent talk by Dr. Max Astrachan of the U. S. Air Force Institute of Technology, Dayton, Ohio. Dr. Astrachan's talk was on the subject "Correlation and prediction equations."

CLEVELAND Prof. W. Allen Wallis of the University of Chicago presented an interesting talk on "Rough and ready statistical tests" at the January meeting. Some rapid methods of testing to show relative importance of data were described and outlined.

The Feb. 3 meeting was held at the Cleveland Engineering Society and consisted of dinner and an excellent talk by Ervin E. Schiesel of the Mattatuck Mfg. Co. In his talk entitled "Engineering Standards and Tolerances," Mr. Schiesel described the method used by his company to make everyone conscious of the importance of specifications. One of the interesting procedures described was the use of Greek letters on blueprints to denote the relative importance of each dimension and to describe the methods of measurement. The session was well received and enjoyed by all.

The second course in fundamentals of quality control is now being given on Monday evenings. The instructor is Charles R. Kendal, who did such a fine job in the first course last fall. Mr. Kendal is a former chairman of the section and is employed by The Lamson & Sessions Co.

COLUMBUS On Jan. 18 the Columbus Ternstedt Div. of General Motors Corp. was host to the section. A steak dinner was served in the plant cafeteria. Gordon A. Olson presented a talk entitled "The use of charts to give direction to vendor quality." In his talk, Mr. Olson developed the theme of helping the vendors to provide a more uniform product which in turn helps reduce downtime in the user's plant. This can be accomplished by informing the vendors of the test results found at incoming inspection.

Twenty-seven new members completed a short basic course of statistical quality control principles. These members, together with eight additional members, attended two conferences on the subject "The functions of a quality control department." These programs were sponsored by the section under the direction of its education chairman.

L. D. Gable, general manager of Timken Roller Bearing Co.'s Columbus plant, gave a very inspiring talk at the annual management dinner held on Feb. 15. In his talk Mr. Gable stressed that quality control techniques should be used to minimize in-plant scrap and customer complaints. These in turn make it possible to produce a better product more economically.

Twenty-six of 27 enrollees representing 19 companies completed the short basic training course sponsored by the section. Certificates of the satisfactory performance were awarded at the annual management dinner.

CORNING -ELMIRA Warren R. Purcell, a consultant from Rath & Strong of Boston, Mass., spoke on the subject of "Quality pre-control—a new tool for long and short runs," at the Feb. 14 meeting. Approximately 75 members and guests attended the dinner meeting and heard Mr. Purcell discuss short-cut methods of determining control limits for short runs.

During the month of February, E. B. Godsey, supervisor of incoming inspection for the Corning Glass Works, delivered a series of four lectures on "An introduction to acceptance sampling by attributes" to approximately 50 quality control people from the Corning-Elmira-Bath areas. Mr. Godsey discussed the advantages and disadvantages of attribute sampling, single and double sampling plans, OC curves and AOC curves. This series concluded a very successful course of 12 lectures which have been sponsored by the section. All those attending the series were presented with "graduation diplomas" signed by the three lecturers: Bob Bechofer, Cornell University; Jack Cherry, Westinghouse; and E. B. Godsey, Corning Glass Works. The membership of the section would like to express their appreciation to these men for a job well done.

DANVILLE -SUNBURY At the Feb. 15 meeting, Dr. W. J. Carr, Bucknell University, presented some statistical correlation techniques used to correlate placement tests with job ability after sufficient training has elapsed. A film on quality control preceded the talk.

DAYTON The Jan. 26 meeting consisted of a brief talk and guided tour of the Airtemp Div., Chrysler Corp., Dayton. E. E. French, chief inspector at Airtemp, gave a brief talk on quality control at Airtemp preceding the guided tours. This is the largest plant of its kind devoted exclusively to the manufacture of commercial and residential air conditioning and heating products.

The Feb. 9 meeting was held at Delco Products, Division GMC. Dr. A. V. Feigenbaum of the General Electric Co. presented an interesting talk on "Management of the QC function." Following his talk Dr. Feigenbaum willingly answered several questions which resulted in an interesting discussion and those members that attended this meeting were pleased with the knowledge gained.

DELAWARE At the Feb. 9 meeting the section enjoyed Dorian Shainan's talk on the subject "Controlling the quality of management decisions" in which he pointed out that industrial management's decisions are based not only on judgment but more especially on facts. Facts, unfortunately, are sometimes illusive and Mr. Shainin discussed three laws or tests by which true facts may be brought out in the open and recognized. Mr. Shainin maintained his reputation as a most engaging speaker and interspersed some fine humor with the meat of his talk.

DENVER Robert I. Tenney, president of the Wahl-Henius Institute, Chicago, Ill., presented an informative talk on "Marketable uniformity in batch operations" at the section's February meeting. We

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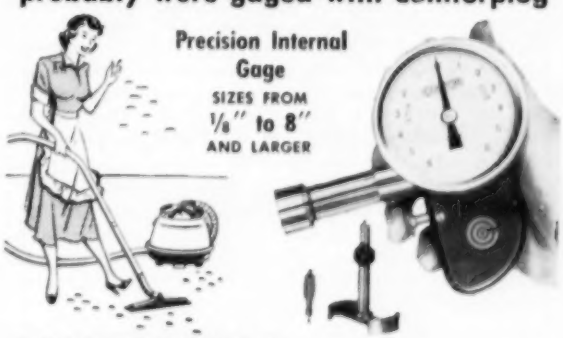

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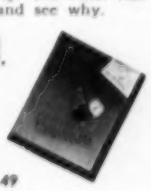

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were pleased to have as guests several representatives of the food preparation and brewing industry in the Denver area. The Wahl-Henius Institute is a scientific research organization applying itself to problems of fermentation and the art of brewing.

ERIE On Feb. 9 we toured the Bucyrus-Erie plant. Two hundred thirty persons attended the tour—and we're a small section of 34 members. J. L. McCartney, chief inspector at Bucyrus-Erie, was program chairman. "Mac" is one of our senior members.

GEORGIA At the sixth regular monthly meeting of the Atlanta group, C. R. Partington, applied science representative of the International Business Machines Corp., Atlanta, delivered a talk on "Digital computers in quality control." He explained the difference between computers, such as analog and digital, and then gave a description of the features performed by the digital type, using the IBM 650 as an example. In addition to showing charts illustrating the work, he carried through a problem, and afterwards displayed some of the important parts of the machine. Attendance included ten members, 11 guests, and two visitors from Delaware, including the chairman of that section.

Another course in industrial statistics is being given on Monday nights from 6 to 9 pm. Donald S. Holmes is conducting the courses which are held at the Georgia Institute of Technology.

GREATER MUSKEGON Despite a very bad snowstorm, 24 couples attended the section's "Ladies Night" program at Bill Stern's Steak House. The ladies were resplendent in their corsages which were supplied by the club. An excellent dinner of "filet mignon" with all the trimmings was thoroughly enjoyed especially by the distaff side of the group. Robert Phinny was guest speaker and his topic was "Keys to action." Mr. Phinny was formerly assistant director of public relations at the Gerber Baby Foods Co. of Fremont, Mich. The evening's entertainment was complete with door prizes as follows: Mrs. Stanley Birleson won a genuine calf leather billfold complete with ten dollars; Myron Pascavis received a Schick "25" electric razor; Mr. and Mrs. Henry Elliott were the recipient's of the couple's prize which was an Arvin portable radio. Mr. Elliott is a charter member of the section. Glenn Bailey, chairman of the program committee, was highly commended for the successful evening.

KANSAS CITY The February meeting of the section was held at the Blue Hills Restaurant. J. Y. McClure, manager of quality control, Convair Aircraft, Fort Worth, Texas was the guest speaker. Following the dinner and business meeting, Mr. McClure presented the subject "Simple quality control—its benefits to men and management" with color slides to supplement his talk. In appreciation of his visit to the section Mr. McClure was presented with a copy of the popular book "How to lie with statistics."

LINCOLN The section met at Hotel Capitol, Feb. 10 and additional tables had to be provided to handle the crowd. The quality control system in Western Electric's Lincoln Shops was explained by eight members of the company, one of which was from Chicago.

LOS ANGELES On Feb. 14 the section was treated to an exhibit and lecture by the Do-ALL Co. on the history of mankind based on his use of tools. This interesting and enlightening lecture was given by Mr. Schelly of the Wilkie Foundation. The use of tools and types of tools is a good indication of the type of civilization man had at any period of his history.

MICHIGAN "Frequency distributions and process capabilities" was the subject of a subsection meeting held Feb. 3 at Post Cereals Club House in Battle Creek. Deland H. Davis, quality control manager for the Post Cereal Div. of General Foods Corp., was the speaker for the evening.

The regular monthly meeting of the section was held on Feb. 17 at Wayne University, Detroit. "Discovery Sampling" was the topic discussed by Ervin F. Taylor, supervisor, quality control analysis section for North American Aviation, Inc., Columbus, Ohio. A lively questioning period followed the somewhat controversial subject with many of the audience participating.

MILWAUKEE One hundred and fifteen members and friends attended our Jan. 16 meeting to hear William F. Kohl's presentation of the "Application of Tabulating equipment to quality control." Bill is the designer of the tabulating system now in use at Allis-Chalmers Mfg. Co. He described his system and demonstrated the forms, charts, and reports now being used. "Local boy makes good" could easily describe Bill. He did an excellent job.

MINNESOTA The Feb. 21 meeting was held at the University of Minnesota and a very good turnout was on hand to hear the story of how to go about setting up "Visual standards using photography." The speakers were Armond Stoefen and Arthur Cunnien of the Toni Co., St. Paul. Slides were used to illustrate the techniques used and to point out how to go about classifying the various kinds and types of visual defects occurring in both product and in packaging.

MONTREAL The Feb. 22 meeting held at the La-Salle Hotel was a dinner meeting. Our guest speaker was John Watson of the British American Oil Co. who spoke on the "Application of regression techniques and control charts to the recording and control of operating expense. The dinner meeting was attended by 40 members and guests.

NEW HAMPSHIRE The February meeting was held at the Manchester YWCA where a home style supper was served at 6:30 pm preceded by a meeting of the executive committee. Our speaker of the evening was Roy G. Volkman, chief chemist at the general products plant of the United States Rubber Co., Providence. Mr. Volkman's very informative and educational talk was entitled "The acceptance control chart."

NORTHEASTERN INDIANA On Feb. 9 Fred J. Berkenkamp, quality control engineer of the General Electric Co., Schenectady, N. Y., spoke on the subject of "Quality cost—a powerful measuring and programming tool."

NEW HAVEN Charles A. Reed, of the General Electric Co., Ashland, Mass. was guest speaker at the Feb. 14 meeting. Mr. Reed, quality control manager of the clock and timer department,

presented a very interesting lecture on "Establishing visual inspection procedures." This was an original paper which illustrated a method for taking the guesswork and opinion out of visual inspection practices. Refreshments—beer and pretzels—were served following the meeting and the entire program was enjoyed by all.

PHILADELPHIA Dr. Amihud Kramer, professor of food technology at the University of Maryland, substituted very ably for H. Elkind who was transferred too far away to get to the meeting. His talk was revealing and timely. Other sections should look forward to his talks—get him on the program.

The feature of our February meeting was Inspector Robert Selfridge's inspiring talk on statistical data processing in the police activities of the Philadelphia Police Department.

PITTSBURGH One of the largest turnouts of the year was on Jan. 24 when approximately 60 members and guests heard D. C. McCune of Jones & Laughlin Steel Corp. give a very interesting talk on "Some short cut statistical methods."

On Feb. 28 members and guests of the section learned some more about operations research in a well received talk by Maurice Sasieni and Van Court Hare of Case Institute of Technology. Their title was "Case studies in operations research."

PITTSFIELD The speaker at the section's regular monthly dinner meeting held at the Stanley Club in Pittsfield on Feb. 2 was Dr. Alfred W. Jones, associate professor of mathematics at Rensselaer Polytechnic Institute. Dr. Jones' talk, on certain problems of operations research, was an excellent one, much appreciated by a group of 40 members and friends.

RHODE ISLAND The January meeting of the section was a lively panel discussion on "Quality control problems." The panel was under the leadership of "Cliff" Kennedy, with the following panel members: R. Shaw Goldthwait, John Hird, and Neil MacLaren.

The February meeting of the section consisted of a Ladies' Night Valentine dinner dance held at the Pawtucket Country Club. A cocktail hour preceded the fine boneless chicken, Maryland style dinner that was served. A vote of thanks goes out to Sam Ramsay who did such a fine job with the entertainment program. A grand time was had by all!

ST. LOUIS At the anniversary meeting held on Feb. 17 the local section president, Joe Movshin, and the group were most happy to present ASQC President Arthur Bender two award checks of $50 each, one for the Brumbaugh Award fund and the other for the Shewhart Medal Award fund. (The photograph pictorially describes the happy occasion. Mr. Movshin is on the left.) Mr. Bender's presentation of "Kwiksee" was most interesting and well appreciated by all members present.

Mr. Movshin gave a very enlightening talk on "Explaining statistics to industry" before the St. Louis section of the Society for Advancement of Management on Feb. 29. The interesting talk was illustrated with dice, cards, and slot machines.

The St. Louis section's award for a student at St. Louis University for his paper on statistical quality control has been awarded to Stanley Joseph Ramatowski. His paper was entitled "A brief review of quality

control and chi-square control charts." Mr. Ramatowski will receive a $50 prize and a year's student membership with the society later this month. The runners-up, who will also receive a year's student membership with the society, were Felix James Wichland for his paper entitled "Control charts" and James Higgins for his paper "Control charts for individual measurements."

SAN FRANCISCO BAY AREA On Feb. 6 the section held the second in a series of educational meetings with Dr. George Resnikoff of Stanford University discussing the topic "Some methods in variable sampling inspection." Dr. Resnikoff is known nationally for his extensive development work in the field of variable sampling.

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The section's regular monthly dinner meeting held Feb. 23 was co-sponsored by the Society for Non-Destructive Testing. The combined group heard Dr. Leslie Ball, of United Geophysical Corp., Pasadena, speak on "Laboratory testing to achieve reliability in complex system." Dr. Ball's talk provided the audience with an informative look at a reliability testing program.

SCRANTON -WILKES-BARRE The speaker for the Feb. 15 meeting held at the YMCA Bldg. was D. M. Kohlhas, supervisor of quality control, Lukens Steel Co., Coatesville, Pa. Mr. Kohlhas gave a very interesting and enlightening discussion on the development and use of $\overline{X}$ and R charts in a shop producing a wide variety of gas cut steel shapes in lots varying from one piece to several hundred pieces. Following his talk a question and answer discussion was held which was of great interest to all present.

SEATTLE Professor Berl W. Owens presided at the section's annual "problem clinic" night held on Feb. 14. Though hampered by snow and icy roads, the clinic was well attended and a lively discussion was held.

The Seattle section was invited to the Feb. 28 dinner meeting of the Seattle Chapter of the National Office Management Association. Lawrence A. Smith, Jr., from the management consulting firm of Booz, Allen & Hamilton spoke on "Automation: its impact on your office."

SOUTH BEND -MISHAWAKA The regular monthly meeting was held on Jan. 19 at the University of Notre Dame's Engineering Auditorium. J. G. Van Gieson, quality control manager for the Magnavox Co., Fort Wayne, Ind., was the speaker of the evening. His topic was "Are you looking for an executive?" Vince Nichols, chairman of the local section, presided.

As a special activity the section held a "Ladies' Night" for its Feb. 16 meeting in the private dining room of Club Normandy, Mishawaka, Ind. Our guest speaker was Dr. Henry D. Hinton, professor of chemistry, University of Notre Dame. Dr. Hinton gave an excellent talk on every day products used in the home. Products such as antibiotics, synthetic fibres, snythetic plastics, rubber, detergents, and many more items were dwelled upon in a layman's language. Dr. Hinton tied in the close needs for quality control in the manufacture of the products used in our homes. An attendance of 100 people filled the dining room. We had management people of three industries recently added to our community as guests.

The section recently completed its first year of organization having been chartered as the 83rd section in August 1954 with a membership of 35. We now boast a membership of 102 and are still growing with an unofficial national ranking of third largest section. Watch us grow even larger in the months to come.

SOUTHERN CONNECTICUT The meeting of Jan. 11 was well attended. The speaker of the evening was George Scheel, Sonotone Corp., Elmsford, N. Y. His topic was "Long-range data analysis." The one thing that was noticed at this meeting, due to the interesting subject, was the large number of women in attendance from the electronic industries in the local area. They showed their interest in quality control by joining in the question and answer period after the talk was given.

D. N. Smith, manager of research engineering, Jones & Lamson Machine Co. Springfield, Vt., was the speaker at the Feb. 8 meeting. His topic, "Application of the pre-control technique" described the latest development among quality control that keeps production within allowable tolerance limits while the process operates. The interest in this topic was quite apparent by the question and answer period which followed Mr. Smith's talk. The members and non-members in attendance kept the speaker busy in answering their questions on the pre-control technique.

SOUTH TEXAS A good, thought-provoking speech is always popular and beneficial to a group. Such was Charles Bicking's address to the section at the Jan. 11 meeting. Mr. Bicking's subject was "Establishing a quality control program." This subject might have been too elementary for most speakers to stimulate this section; however, judging from the overflow crowd and the question and answer session following the speech, it could only be concluded that Mr. Bicking had injected just exactly the right amount of wisdom and wit into his talk to make the evening successful. We sincerely hope he will return in the not-too-distant future.

STATE UNIVERSITY OF IOWA The January meeting in Des Moines was an excellent one. It included a plant tour of the Armstrong Rubber Co. and a discussion of their statistical quality control applications led by R. W. Cheetham, quality control engineer at Armstrong Rubber.

The dinner banquet, which was preceded by an enjoyable social hour, featured talks by Arthur Bender, ASQC President, and Hiram Hunn, a Des Moines attorney. Mr. Bender discussed the moving of the national office and other society activities. Mr. Hunn evoked considerable comment from the members with his talk on "Human relations in industry."

At the morning session, Mr. Bender presented "Kwik See" with illustrations of practical applications of this procedure in his work. It was a real treat for the attending members.

TENNESSEE Memphis Subsection The Feb. 28 meeting was held on the Memphis State College campus. R. L. Murray, Rutherford Garment Co., Rutherford, presented "How quality control techniques aid in the most difficult operations." Mr. Murray related some of his experiences in the highly skilled garment industry.

TOLEDO The February meeting of the section included an educational session led by Mel E. Lindner, Owens-Illinois Glass Co. The subject of the session was "Sampling—general." Ervin F. Taylor of North American Aviation Corp. conducted the main feature of the evening with a talk on "Discovery sampling." The fine dinner at Angelo's was enjoyed by all.

WESTERN MASSACHUSETTS A basic course in statistical quality control, under the sponsorship of the section and the Massachusetts University Extension, was started on Feb. 15. The course, which will consist of 15 sessions, has a total enrollment of 30.

WICHITA The section joined the other technical societies of the area on Feb. 3 for their annual joint meeting which was held at the Broadview Hotel, Wichita, Kans.

The speaker for the meeting was Harry Corbin, president of Wichita University. His presentation was entitled "Quantity and quality of higher education." Mr. Corbin furnished a complete picture of the situation of education in our expanding industrial, social and technical fields. There were approximately 200 members and guests in attendance.

WINDSOR On Feb. 8 Mr. Zabek of the Aluminum Co. addressed the section on quality control at the aluminum plant at Etobicoke, Ont. Twenty-three members and 29 guests were present. The "Kitimat Story", a technicolor film, was also shown.

WORCESTER R. Shaw Goldthwait, director of quality control at Collyer Insulated Wire Co., Pawtucket, R. I., presented a talk on "Quality control at Collyer" at the Feb. 16 meeting. Mr. Goldthwait is a Fellow of the Society. His talk was very interesting and was enjoyed by all.

YOUNGSTOWN Dale L. Lobsinger, superintendent of quality control for United Air Lines, presented a very interesting talk on "Customer-vendor relationship" at the Feb. 9 meeting held at the Astoria Cafe. If the number of questions asked after his well illustrated talk could be used to judge the interest created, one would have to give it top billing. A return engagement will certainly be requested.

". . . CAST THEIR SHADOWS BEFORE"

ALBUQUERQUE The May 7 meeting will be held at Mitchell Hall, University of New Mexico, 7:30 pm and will consist of a general meeting and a discussion period. A panel of experts in the field of management, purchasing, engineering, production, inspection, and quality control will summarize "The Industrial Interrelationship with quality control."

BIRMINGHAM Charles L. Harris, division methods engineer, Pepperell Manufacturing Co., Pepperell, Ala., will be the speaker at the regular monthly meeting to be held on May 10. He will talk on "Pepperell's quality control program in the grey mill."

BUZZARDS BAY M. S. Renner of the Dewey and Almy Chemical Co. in Cambridge, Mass., will discuss "The role of statistical quality control in today's chemical industry" at the next section meeting. The date will be announced later.

CHICAGO The next meeting of the introductory educational group will be held on May 3 at the University of Illinois Extension Bldg. on Navy Pier at 7:30 pm.

On May 15 the Calumet sub-group will hold its dinner meeting at San Remo, located at 3904 Ridge Road (Rt. 6) Highland.

The fourth and final plant tour arranged by the plant tour committee will be made on May 16 through the Victor Adding Machine Co. This tour should be very

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interesting for Victor is one of the Chicago area's pioneers in the application of statistical techniques to fabricating and assembly operations. Format of the tour will include a presentation by E. G. Freund, manager of quality control at Victor, on "The applications of statistical techniques to Victor's progresses."

CINCINNATI Our meeting next month will be held at the Engineering Society of Cincinnati Bldg. The speaker for the evening is slated to be Robert I. Tenney of the Wahl-Henius Institute, Chicago. While the title of Mr. Tenney's talk is "Statistical quality control in beer manufacture," it will be slanted to the process industries in general with a discussion on applications of precision control methods adapted to process work.

CLEVELAND The last formal meeting of the year will be held on May 4 at the Cleveland Engineering Society. The speaker of the evening will be Donald F. Flanders from the Allison Division of General Motors Corp. His subject will deal with "The mechanics of lot plot." A dinner at 6:30 pm will precede the meeting.

CORNING -ELMIRA The section will sponsor a "management night" to be held on Tuesday evening May 8 in Corning. Full details of the program will be announced at a later date.

DANVILLE -SUNBURY The April meeting will feature a talk describing quality control in the Aircraft Parts Industry. This will be a meeting that you won't want to miss. Plan to attend now.

DAYTON The last regularly scheduled meeting will be held on May 10. This will be a dinner meeting with E. H. Robinson of the Johnson & Johnson Co. as the principal speaker. Mr. Robinson's subject will be "Adjusting production plans to sales trends."

DELAWARE The final meeting of the current season will be held on May 3. It will be a round table discussion of industrial quality control problems led by a panel of members selected from various industries represented in the section. Actual problems and their solutions will be discussed and those attending are urged to participate not only by presenting problems to which a satisfactory and workable solution has been found but also to bring unsolved problems to the meeting for open forum discussion. This meeting will also include the annual business meeting and reports of officers and committee chairmen.

The final session of the educational clinic series on the subject "Introduction to experimental design" will precede the dinner and meeting.

ERIE "OR—Operations Research" is the topic for our meeting of May 8. Eliezev Naddor of the operations research group at the Case Institute of Technology, Cleveland, will present the program. This is the last regularly scheduled event of the season, however, our committee is weighing the possibilities of having a summer social program with such items as a picnic, fishing party, baseball tour to Cleveland, etc. to keep members in touch with one another.

GEORGIA At the next regular meeting of the Atlanta group on Tuesday, Apr. 24, an informative talk on "Linear programming" by Robert A. Bosack, head of mathematical analysis, Lockheed Aircraft Corp., Marietta, Ga., will be presented. This meeting will be held at 7:45 p.m. in Room 1833 of the Hurt Bldg., Atlanta.

GREATER MUSKEGON The April meeting of the section will consist of a plant tour through Sealed Power Co., Muskegon. Sealed Power manufactures piston rings. The plant tour will be preceded by a dinner at Bill Stern's Steak House.

KANSAS CITY On the night of May 9 the section will meet at the Muehlbach Brewery. Wives and friends will be guests at this meeting which will combine dinner, a social hour, plant tour, entertainment and the annual election of officers.

MICHIGAN The meeting scheduled for Apr. 20 will be held at the Rackham Bldg., University of Michigan, Ann Arbor. Robert D. Muir, chief inspector for Lundberg Screw Products Co., Lansing, Mich., will present a talk entitled "Lot plot in a job shop."

On May 18 the section will hold its final monthly meeting at Science Hall, Wayne University. Dale L. Lobsinger, United Air Lines, will discuss "Quality control applied to the office." This meeting will be cosponsored by the Detroit chapter of the National Office Management Association.

MONTREAL The regular monthly meeting will be held at the Mechanics Institute. Our guest speaker will be E. B. Ferrell of the Bell Telephone Laboratories, Murray Hill, N. J. This promises to be a very enjoyable and useful talk.

MUNCIE Harry E. Sogen, production quality control division, Abbott Laboratories, North Chicago, Ill., will speak before the section on Thursday evening May 17. Mr. Sogen's topic will be "Developing quality attitude and pride of workmanship."

NEW HAVEN On May 8 the final regular meeting of the current season will feature Bill MacCrehan as guest speaker. His topic will be "Elimination of receiving inspection through effective vendor liaison." His reputation as a dynamic speaker with unique and interesting methods of putting his point across insures all an enjoyable evening. Installation of the new officers will take place at the business meeting.

PHILADELPHIA E. C. Harrington, Jr., Monsanto Chemical Co., will talk on "New experimental designs—repose surface experimentation." This is our "long hair" meeting for the "brains" of the area. The meeting will be held Apr. 20 at 8 p.m. at Franklin Institute.

Ford Motor Co. again acts as host to the combined membership of the Philadelphia, Lansdale, and Trenton sections for a plant tour in Chester to be held on Friday, May 18 at 2 pm.

PITTSFIELD On May 3 in Williamstown, Mass., the section will be co-hosts at a joint IRE-ASQC evening dinner meeting. Speaker for the evening will be F. J. Sindelar of International Business Machines, Inc., in Poughkeepsie, N. Y., who will talk on

"Quality control of complex assemblies." Dinner will be at the Williams Inn, with the talk to follow at Williams College. A very good turnout is expected.

RHODE ISLAND Our April meeting will have two featured speakers; W. Kinney will speak on "Quality control improves fiberglass" and W. D. Miller will speak on "Practical use of quality control in jewelry manufacturing."

SCRANTON -WILKES-BARRE All members of our section are looking forward with great interest to our April meeting in Wilkes-Barre, Pa. The speaker for this meeting will be E. Rogge from Leeds and Northrup Co., Philadelphia. His subject will be "Company education on the quality problem."

SEATTLE The May meeting will be conducted as a joint meeting with the Institute of Food Technologists. It will consist of a plant tour of the Sick's Seattle Brewing & Malting Co. and a talk on "Taste panel in quality control." Members and their wives are invited to attend. Refreshments will be served.

SOUTHERN CONNECTICUT The final meeting of the 1955-56 season will be held on May 9. This is the big night of the season and is our ANNUAL BANQUET. The speaker will be Charles P. DeVoss, manager of manufacturing, Continental Division of Ford Motor Co., Dearborn, Mich. The topic will be "The Continental and quality." Ford Motors' new Continental is being designed and built to the highest quality standards. This will be an opportunity for the members to hear an automobile executive tell the way quality control is applied to the manufacture of a luxury automobile. From all indications this should be one of the biggest meetings in the section's history.

STATE UNIVERSITY OF IOWA Our next meeting will consist of a two day educational seminar to be held at Iowa City on May 24-25. The seminar will be under the direction of Lloyd Knowler. Since this will be one seminar that you won't want to miss, plan now to attend.

TOLEDO The April meeting will be our second plant trip of the season. The Sylvania Electric Products Co. at Ottawa, Ohio will play hosts to the trip participants. Sylvania is one of the largest producers of television bulbs in this country, and their methods of quality control on such electronic parts portends to be one of great interest to our section.

WESTERN MASSACHUSETTS The annual social meeting of the section will be held on May 15. Wives, acquaintances, and "girl Fridays" will be honored. The program will be social and cultural, rather than technical.

WICHITA J. B. Cobb of Standard Oil Co.'s Sugar Creek Refinery in Independence, Mo., will be the speaker at the May 8 meeting. Mr. Cobb will speak on "Quality control in the petroleum industry."

WORCESTER A. B. Holmstrom, vice president of Norton Co., Worcester, Mass., will be the speaker at the May 17 meeting. His subject will be "Management's viewpoint of quality control." This is the last meeting of the season.

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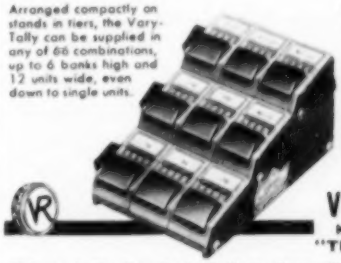

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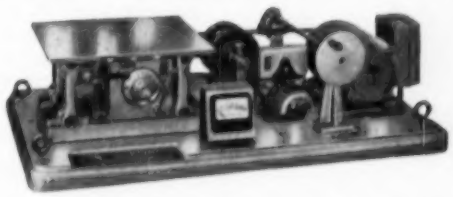

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YOUNGSTOWN The section will close its season with a plant visitation to the General Fireproofing Co. in Youngstown, Ohio. Several technical groups have visited this plant and a well rounded program will be given to our section. Both members and friends will be welcome to take the plant tour and attend the meeting which will be held in their conference room.

"AS YE SOW . . ."

NORTHEASTERN INDIANA Don F. Hensel, Dana Corp., chairman of the annual conference committee, announced that he and his co-chairmen, Ed Bird, Dana Corp., and Paul Koogle, General Electric Co., have completed plans for the Ninth annual conference of the Northwestern Indiana section, which will be held May 3 at the Chamber of Commerce, Fort Wayne, beginning with registration at 12 noon.

Immediately after registration, a plant tour of the facilities of the Joslyn Manufacturing and Supply Co., manufacturers of stainless and alloy steels, will be conducted. Upon return to the Chamber of Commerce, the assemblage will hear the following: Ervin Taylor, quality control analysis, North American Aviation Corp.—"Discovery sampling by attributes;" Howard Jones, Illinois Bell Telephone Co.—"Statistical techniques as applied to managerial control;" Harmon F. Bayer, quality control consultant—"Installing a quality control program."

The after dinner speaker will be Dale L. Lobsinger, United Air Lines, whose subject will be "ASQC looks at supervision."

This year's conference theme will center around the best means to use the techniques learned during the past ten years in administrative applications.

CORNELL UNIVERSITY STATISTICS SEMINAR JUNE 12-15 A seminar on "Applied industrial statistics" will be conducted by the department of industrial and engineering administration, Sibley School of Mechanical Engineering, Cornell University, at Ithaca, N. Y., June 12-15. The discussion leaders and speakers will be specialists from both industry and the staff of the college of engineering at Cornell.

For additional information contact: Andrew Schultz, Jr., Department of Industrial and Engineering Administration, Cornell University, Ithaca, N. Y.

MARQUETTE UNIVERSITY MATHEMATICS IN MANAGEMENT MAY 15-17 The management Center of Marquette University will conduct a three day conference designed for those who wish to improve the quality of their managerial decisions by making better use of available data. The staff consists of Gayle McElrath, a professor of the department of mechanical engineering at the University of Minnesota; Harmon Bayer, quality control consultant from Detroit, Mich.; Dr. Joseph Talacko, ass't. professor of mathematics at Marquette University; and Dr. Marvin E. Mundel, vice director of the Marquette Management Center.

The course fee is $54.00 and registration will be limited to 25 enrollees to permit effective discussion of all aspects of each topic.

For reservation or further information, write to: Dr. Russell L. Moberly, Director, Management Center, College of Business Administration, Marquette University, Milwaukee 3, Wis.

MARQUETTE UNIVERSITY QC SHORT COURSE JUNE 18-29 A two week short course, "Introduction to quality control by statistical methods," covering the basic techniques, basic charts, sampling, applying, and controlling aspects of quality control, will be conducted at the Marquette University Management Center, June 18-29. The conference director is Dr. M. E. Mundel.

The course is designed to offer the enrollees an opportunity to familiarize themselves with fundamentals; examine sample problems; become acquainted with the latest thinking and techniques in the field; broaden their concept of the use of statistical methods; and discuss common problems.

The staff is comprised of Professor Gayle McElrath, University of Minnesota, and Harmon S. Bayer, quality control consultant from Detroit, Mich. The full time staff will be assisted by numerous guest speakers from industry.

The course fee is $180.00 which includes all materials and ten lunches. The enrollment is limited. For registration or further information, contact: Dr. Russell L. Moberly, Director, Management Center, College of Business Administration, Marquette University, Milwaukee 3. Wis.

NEW YORK UNIVERSITY STATISTICAL QC SEMINAR APRIL 30-MAY 4 The sixth statistical quality control seminar for the graphic arts industries will be conducted Apr. 30–May 4 by New York University's division of General Education at Gould House, Ardsley-on-Hudson, N. Y. The intensive five day course includes day and evening sessions covering the uses of statistical quality control as a buying tool, control charts, sampling plans, and statistics fundamentals.

The staff consists of: Donald Macaulay, Paper Quality Control, Inc.; August B. Mundel, quality control director, Sonotone Corp.; Dr. Carl Noble, director consumer acceptance dept., Kimberly-Clark Corp.; B. E. Sooy, Wolverine Carton Co.; Dr. Edward Duffie, assistant to the production vice president, Doubleday and Co.; and F. L. Wurzberg, development engineer product engineering department, Interchemical Corp.

Further information on the seminar can be obtained from Aaron Feinsot, Director of the Office of Special Services to Business and Industry, Division of General Education, New York University, 6 Washington Square North, New York 3, N. Y.

NEW YORK QC COURSE MAY 18-26 An intensive eight day course in statistical quality control will be held at the Hotel Lexington in New York city from May 18 through May 26. The course will provide instruction in control charts and sampling acceptance procedures, along with practical applications of the methods.

For information concerning the course, contact Ralph E. Wareham and Associates, Consultants on Quality Control, at 122 Orchard Ridge Road, Chappaqua, New York.

OHIO STATE UNIVERSITY ENGINEERS CONFERENCE MAY 4

The Third Annual Conference for Engineers sponsored by the College of Engineering of the Ohio State University will be held on May 4. The keynote address on "The creative age—a challenge to engineers" will be delivered by John R. Hoover, president of the B. F. Goodrich Chemical Co. of Cleveland. At the luncheon session, Dr. Dean E. Wooldridge, president of the Ramo-Wooldridge Corp. of Los Angeles, will present the feature address on "Systems Engineering." Following the talk, technical sessions will be held in the various engineering departments devoted to the discussion of up-to-the-minute engineering progress and developments.

Requests for information and reservations should be addressed to Harold A. Bolz, Associate Dean, College of Engineering, The Ohio State University, Columbus 10, Ohio.

(Continued on page 25)

10th annual convention of THE AMERICAN SOCIETY FOR QUALITY CONTROL

Committee Meetings Schedule

(All meeting rooms shown are at Sheraton-Mount Royal Hotel except the Annual Meeting of the Society)

TIME	DATE & MEETING	ROOM
	TUESDAY, JUNE 5, 1956	
8:30 am	"OLD" Executive and Operating Committees	Brittany
	WEDNESDAY, JUNE 6, 1956	
7:30 am	Breakfast—All Moderators of Wednesday Technical Sessions	Parlor K
	Breakfast—All Division and Committee Chairmen under Mr. Shainin	Parlor J
	Breakfast—All Committee Chairmen under Mr. Toulouse	Parlor L
4:35 pm	ANNUAL MEETING OF THE SOCIETY	Showmart
7:?0 pm	All Section Officers	Brittany
	Business Advisory Committee for IQC	Parlor K
	Film Committee	Parlor L
	Historical Committee	Parlor J
	Program and Speakers Committee	Parlor M
	Section Affairs Committee	Parlor I
	THURSDAY, JUNE 7, 1956	
7:30 am	Breakfast—All Moderators of Thursday Technical Sessions	Parlor K
	Breakfast—Examining Committee	Parlor C
8:30 am	Awards Committee	Parlor I
	Constitution and By-Laws Committee	Parlor L
	Education and Training Committee	Brittany
	Manufacturing and Assembly Committee	Parlor M
	Membership Committee	Parlor K
	Professional Ethics and Qualifications Committee	Parlor J
2:30 pm	"NEW" Board of Directors	Brittany
	Auditing Committee	Parlor L
	Bibliography Committee	Parlor M
	Vendor-Vendee Relations	Parlor I
	Yearbook Committee	Parlor K
6:15 pm	ANNUAL BANQUET OF THE SOCIETY	
9:30 pm	Editorial Board	Parlor L
	Financial Advisory Committee	WRW
	Office Procedures Committee	Parlor J
	Publicity and Promotion Committee	Parlor I
	Standards Committee	Parlor M
	Textile Division Council	Parlor K
	FRIDAY, JUNE 8, 1956	
7:30 am	Breakfast—All Moderators of Friday Technical Sessions	Parlor K
8:30 am	Detroit Convention Program Planning Group	Parlor I
	Applied Methodology Committee	Parlor J
	Brewing Industries Committee	Parlor K
	Operations Research Committee	Parlor M
	Relations with other Technical Societies	Parlor L
	Saddoris Award Committee	Brittany
12:30 pm	Luncheon—Administrative Applications Division	Parlor D
	Luncheon—Aircraft Division	Parlor J
	Luncheon—Automotive Division	Parlor L
	Luncheon—Chemical Division	Parlor A
	Luncheon—Electronics Division	Parlor M
	Luncheon—Textile Division	Parlor E
	Luncheon—Metals Technical Committee	Parlor K
2:30 pm	"OLD" plus "NEW" Board of Directors	Brittany
8:30 pm	Chairmen of All Divisions and Committees under Mr. Shainin	Parlor J
	Chairmen of All Committees under Mr. Toulouse	Parlor L
	Regional Conferences Committee	Parlor K
	SATURDAY, JUNE 9, 1956	
8:30 am	"NEW" Executive and Operating Committees	Brittany
	General Convention Committee	Parlor L

(Hotel Reservations must be picked up not later than Wednesday morning, JUNE 6)

TENTH ANNUAL CO

Series	I—Wednesday, June 6 11:00-12:00	II—Wednesday, June 6 2:00-3:00, 3:30-4:30	III—Thurs
A	**1.** **Speaker:** I. A. DeGROTE, Ford Motor Company, Dearborn, Michigan **Subject:** "Engine Manufacturing and Foundry Operations" **Moderator:** J. R. SEIP, General Motors Corporation, Lansing, Michigan	**1.** **Speaker:** H. C. CHARBONNEAU, General Motors Institute, Flint, Michigan **Subject:** "Statistical Approach to Gauge Tolerances" **Speaker:** B. P. SEIPEL, Studebaker-Packard Corporation, Detroit, Michigan **Subject:** "Developing a Quality Control Program for Automation" **Moderator:** R. M. CURRIE, Ford Motor Company, Dearborn, Michigan	**2.** Conférencier: Sujet: Introduction: Conférencier: Sujet: Président:
B	**4.** **Speaker:** KENTON R. WILLHITE, North American Aviation Corporation, Los Angeles, California **Subject:** "Getting the Most Out of a Quality Control Budget" **Moderator:** JAMES L. COBURN, Convair, Fort Worth, Texas	**4.** **Speaker:** R. F. MARTIN, North American Aviation Corporation, Los Angeles, California **Subject:** "Electronic System Failure Reporting Methods" **Moderator:** PETER JACKSON, Canadair, Limited, Montreal, Quebec **Panel:** J. M. JOSEPH, Glen L. Martin Aircraft Corporation Baltimore, Maryland H. B. EPSTEIN, Chance Vought Aircraft Corporation, Dallas, Texas W. S. HAY, Convair, Fort Worth, Texas **Subject:** "Controlling the Quality of Bonded Panels—Honeycomb & Laminated Type" **Moderator:** ERVIN TAYLOR, North American Aviation Corporation, Columbus, Ohio	**1.** Speaker: Subject: Speaker: Subject: Moderator:
C	**5.** **Speaker:** FRANK W. WEHRFRITZ, Esso Standard Oil Company, Linden, New Jersey **Subject:** "Uses of the Propagation of Error" **Moderator:** OTTO A. KRAL, Minnesota Mining & Manufacturing Company, St. Paul, Minnesota	**5.** **Speaker:** H. C. BATSON, University of Illinois, Chicago, Illinois **Subject:** "Applications of Fractional Chi-Square Analysis to Experiments in Chemistry" **Speaker:** J. S. HUNTER, American Cyanamid Company, New York City, New York **Subject:** "Optimization Technique in Chemical Development" **Moderator:** EDWARD J. DELATE, E. I. Dupont de Nemours & Company, Buffalo, New York	**5.** Speaker: Subject: Speaker: Subject: Moderator:
D	**7.** **Speaker:** MAURICE HAUSER, Bruck Mills, Limited, Cowansville, Quebec **Subject:** "Practical Preventive Machinery Maintenance" **Moderator:** WALTER L. GODDARD, J. P. Stevens & Company, North Andover, Massachusetts	**7.** **Speaker:** FRED GOLDEN, United Merchants & Manufacturers, Inc., New York City, New York **Subject:** "Integrated Quality Control from Weaving Mill to Sewing Plant—A Case Study" **Speaker:** ROBERT R. MacNEIL, Cosmos Imperial Mills, Limited, Yarmouth, N. S. **Subject:** "Quality Control in the Coarse Goods Mills" **Moderator:** FRANCOIS E. CLEYN, Leach Textiles, Limited, Huntingdon, Quebec	**8.** Speaker: Subject: Speaker: Subject: Moderator:
E	**10.** **Panel:** LEONARD A. SEDER, Consultant, Malden, Massachusetts GEORGE VASILOFF, IBM Corporation, Poughkeepsie, New York PAUL A. ROBERT, Gruen Watch Company, Cincinnati, Ohio ALLIN P. DEACON, Consultant, Brantford, Ontario **Subject:** "Quality Control in a Job Shop Operation" **Moderator:** E. J. SINDELAR, IBM Corporation, Poughkeepsie, New York	**9.** **Panel:** NATHAN BRODSKY, Office of the Asst. Secretary of Defense, Washington, D. C. THOMAS S. CZARSKI, Department of National Defense, Ottawa, Ontario DONALD A. IRWIN, Canadian Arsenals, Limited, Toronto, Ontario JOHN J. RIORDAN, Office of the Asst. Secretary of Defense, Washington, D. C. **Subject:** "Quality Control in Defense" **Speaker:** G. DAW, R.C.A.F., Edmonton, Alberta **Subject:** "Quality Control in the R.C.A.F." **Moderator:** A. V. FEIGENBAUM, General Electric Company, Schenectady, New York	**11.** **Panel:** Subject: Moderator: Speaker: Subject: Moderator:
F	**12.** **Speaker:** J. ROBERT BEHRMAN, Alan Wood Steel Company, Conshohocken, Pennsylvania **Subject:** "A Quality Incentive for Open Hearth Melters" **Moderator:** FRANK G. NORRIS, Wheeling Steel Corporation, Steubenville, Ohio	**12.** **Panel:** JAMES A. CURRY, Kaiser Steel Corporation, Fontana, California A. L. RAICH, Colorado Fuel & Iron Corporation, Pueblo, Colorado GEORGE F. WHITE, Reynolds Metal Company, Richmond, Virginia W. T. ROGERS, U. S. Steel Corporation, Lorain, Ohio **Subject:** "Searching for Causes in Integrated Metals Industries" **Moderator:** WADE R. WEAVER, Republic Steel Corporation, Cleveland, Ohio	**13.** Speaker: Subject: Speakers: Subject: Moderator:
G	**14.** **Speaker:** R. L. GRUNEWALD, General Electric Company, Evendale, Ohio **Subject:** "Quality Control Through Personnel Performance Appraisals" **Moderator:** LEON BASS, General Electric Company, Evendale, Ohio	**15.** **Speaker:** RICHARD B. SHARTLE, Standard Register Co., Dayton, Ohio **Subject:** "Quality Control Applied to Clerical Operations" **Speaker:** A. C. ROSANDER, Bureau of Internal Revenue, Washington, D. C. **Subject:** "Sampling Applied to Accounting Problems" **Moderator:** HARMON S. BAYER, Consultant, Detroit, Michigan	**15.** Speaker: Subject: Speaker: Subject: Moderator:
H	**14.** **Speaker:** A. E. R. WESTMAN, Ontario Research Foundation, Toronto, Ontario **Subject:** "Frequency Distributions and Chemical Reactions" **Moderator:** D. B. DeLURY, Ontario Research Foundation, Toronto, Ontario	**17.** **Speakers:** GEORGE W. McDERMOTT, General Motors Corporation, Anderson, Indiana EDWARD J. OAKLEY, General Motors Corporation, Anderson, Indiana **Subject:** "Introduction to Statistical Quality Control" **Moderator:** D. H. W. ALLAN, American Iron & Steel Institute, New York City, New York	**14.** Speaker: Subject: Moderator: Speaker: Subject: Moderator:
I	**KEY** 1. AUTOMOTIVE 2. PROGRAMME FRANCAIS 3. STANDARDS 4. AIRCRAFT 5. CHEMICAL 6. FOODS	**PLANT TOURS** (Concurrent—Wednesday Afternoon, June 6) **Location:** Canadian Industries, Limited, Ammunition Division, Brownsburg, Quebec **Location:** Dominion Rubber Company, Limited, Montreal, Quebec	

ENTION PROGRAM

7 9:30-10:30, 11:00-12:00

Université de Paris, Paris, France
du Controle Statistique de la

TOULOUSE, Owens-Illinois Glass Com-
Ohio
MIER, Régie National Renault, Paris,

la Qualité des Moteurs 4CV Renault"
R, Université de Montréal, Montréal,

LER, Chrysler Corporation, Detroit,
uality Control in Motor Assembly &

ELBERGER, A. O. Smith Corporation,
Wisconsin
trol in Automobile Frame Production"
P, Ford Motor Company of Canada,
ario

SHEWELL, Humble Oil & Refining
town, Texas
l Designs in Paper Studies of
cking"
MAY, Johnson & Johnson, New Brun-
rsey
de Training on Application of Quality
iques"
FREY, Bristol-Myers Products Division,
Jersey

G, Department of the Army, Washing-

Techniques in Paper Testing"
E, Consolidated Paper Corporation,
alls, Quebec
hniques of Pulp & Paper Mills"
Pulp & Paper Research Institute of
real, Quebec

UKAT, Raytheon, Newton, Massachu-

SSLER, IBM Engineering Laboratories,
New York
OE, General Electric Company, Owens-
y
LL, Sperry Gyroscope Company, Great
land, N. Y.
iability of Tubes and Transmitters by
cations"
MUNDEL, Sonotone Corporation,
w York
TER, Signal Corps Supply Agency,
Jersey
pection Quality Assurance Plan"
BSON, International Resistance Com-
phia, Pennsylvania

ER, University of Western Ontario,
o
ts Applicable to Brewing"
and L. K. NEUMAN, Miller Brewing
waukee, Wisconsin
plications of Statistical Quality Con-
ewing Process"
THERMAN

BSINGER, United Air Lines, Incor-
er, Colorado
rol Applied to Management Problems"
LIES, Olin-Mathieson Chemical Cor-
Haven, Connecticut
Research and Its Relation to Quality

Kimberly-Clark Corporation, Neenah,

REHAN, Bendix Radio Corporation,
aryland
Quality Control"
Western Electric Company, Baltimore,

BERT, Gruen Watch Company, Cincin-

Can Do For The Quality Control

WESCOTT, Rutgers University, New
w Jersey

KEY—(cont'd)

PAPER
SERVICES
CTURING AND ASSEMBLY
ONICS

IV—Thursday, June 7 2:00-3:00, 3:30-4:30

2. **Conférencier:** JEAN C. LAFFORGUE, Canadian General Electric Company, Limited, Montréal, Québec
Sujet: "Ma.tre Controle"
Conférenciers: ROLAND ARCHAMBAULT, Canadian Celanese, Limited, Sorel, Québec
J. P. BEAUDRY, Dupont Company of Canada, Limited, Shawinigan Falls, Québec
GASTON FOURNIER, Actonvale Rubber Company, Actonvale, Québec
Sujet: Colloque en Equipe: "Applications"
Président: JACQUES SAINT-PIERRE, Université de Montréal, Montreal, Québec

1. **Speaker:** F. D. REARDON, Electric Auto-Lite Company, Fostoria, Ohio
Subject: "Application of Quality Control in the Manufacturing of Electrical Equipment for Use in Automobiles"
Moderator: B. C. JACOB, JR., Chrysler Corporation, Detroit, Michigan

4. **Speaker:** A. S. BILLINGS, Ryan Aircraft Co., San Diego, Cal.
Subject: "Tool-Proofing as a Means of Quality Control"
Moderator: R. D. HUMPHRIES, Cessna Aircraft Company, Wichita, Kansas

5. **Speaker:** EDWARD FORST, Pittsburgh Plate Glass Company, Creighton, Pennsylvania
Subject: "S.Q.C. in the Glass Industry"
Speaker: R. W. GLENFIELD, Dominion Rubber Company, Limited, Kitchener, Ontario
Subject: "Modernization of Tire Quality Control"
Moderator: EVAN J. LEWIS, Corning Glass Works, Corning, New York

8. **Speakers:** MAURICE E. BLEW, Strathmore Paper Company, West Springfield, Massachusetts, and RALPH E. WAREHAM, Consultant, Chappaqua, New York
Subject: "Establishing a Quality Control Program in the Paper Mill"
Speaker: CARL E. NOBLE, Kimberly-Clark Corporation, Neenah, Wisconsin
Subject: "Scheduling to Minimize Production and Shipping Costs"
Moderator: LAWRENCE PAULSON, Minnesota & Ontario Paper Company, International Falls, Minnesota

11. **Speaker:** SUTTON MUNRO, Bell Telephone Laboratories, Allentown, Pennsylvania
Subject: "Basic Aspects of Tolerances"
Moderator: DONALD D. WARD, JR., General Electric Company, Schenectady, New York
Speaker: LEONARD C. CRAIG, JR., Texas Instruments, Incorporated, Dallas, Texas
Subject: "High Quality at Lower Cost Through Work Simplification"
Moderator: ROBERT G. FITZGIBBONS, Bendix Products Division, Mishawaka, Indiana

13. **Speakers:** MARJORIE L. SUTHERLAND, and ROBERT I. TENNEY, Wahl-Henius Institute, Chicago, Illinois
Subject: "The Application of Statistical Methods in the Brewing Industry"
Moderator: WILLIAM H. VON MEYER, Barry-Wehmiller Machinery Company, St. Louis, Missouri

12. **Speaker:** PHILLIPS WHIDDEN, Aluminum Company of America, Pittsburg, Pennsylvania
Subject: "Design of Experiment in Metals Processing"
Moderator: JOHN V. STURTEVANT, U. S. Steel Corporation, Pittsburg, Pennsylvania

16. **Speaker:** JOHN W. ABRAMS, Department of National Defense, Ottawa, Ontario
Subject: "Military Applications of Operational Research"
Speaker: HOWARD L. JONES, Illinois Bell Telephone Company, Chicago, Illinois
Subject: "A Blend of O.R. & Q.C. in Balancing the Loads on Telephone Equipment"
Moderator: PAUL S. OLMSTEAD, Bell Telephone Laboratories, Whippany, New Jersey

14. **Speaker:** HAROLD F. DODGE, Bell Telephone Laboratories, New York City, New York
Subject: "A Discussion on Sampling Inspection Plans"
Speaker: PAUL C. CLIFFORD, State Teachers' College of New Jersey, Montclair, New Jersey
Subject: "Quality Control in Europe—Past, Present & Future"
Moderator: MARTIN A. BRUMBAUGH, Bristol Laboratories, Incorporated, Syracuse, New York

PLANT TOURS

(Concurrent—Thursday Afternoon, June 7)

Location: Northern Electric Company, Limited, Wire and Cable Division, Lachine, Quebec
Location: Imperial Tobacco Company of Canada, Ltd., Montreal, Quebec

V—Friday, June 8 9:30-10:30, 11:00-12:00

3. **Speaker:** WALTER A. SHEWHART, Bell Telephone Laboratories, Murray Hill, New Jersey
Subject: "The Bases of a Standard"
Speaker: FRED C. CRANE, JR., Crane & Company, Dalton, Massachusetts
Subject: "Establishing Quality Standards in the Paper Industry"
Speaker: DAVID M. KOHLHAS, Lukens Steel Company, Coatesville, Pennsylvania
Subject: "Quality Standards for Short-Run Production"
Moderator: RALPH E. WAREHAM, Consultant, Chappaqua, New York

4. **Speaker:** ALLEN M. HULL, United Air Lines, San Francisco, California
Subject: "Use of Statistical Quality Control in Determining Optimum Component Time Between Overhauls"
Moderator: THOMAS G. GREGORY, Thompson Products, Incorporated, Danville, Pennsylvania
Speaker: LESLIE BALL, United Geophysical Corporation, Pasadena, California
Subject: "Management Use of Laboratory Testing to Achieve Reliability"
Moderator: STANLEY DeMAIN, Avien, Incorporated, Woodside, New York

6. **Speaker:** EDWARD P. LEE, General Foods Corporation, White Plains, New York
Subject: "A Statistical Quality Control Approach to Weights and Measures Problems"
Speaker: AMIHUD KRAMER, University of Maryland, College Park, Maryland
Subject: "Selecting an Efficient Sampling Procedure for Food Products"
Speakers: R. I. WEIMERSKIRCH, Continental Can Company, New York, New York
C. B. WAY, Green Giant Company, Le Sueur, Minnesota
Subject: "A Mutual Approach to Quality Control by Can Manufacturer and Food Processor"
Moderator: HOWARD L. STIER, National Canners Association, Washington, D. C.

9. **Speaker:** NATHAN BRODSKY, Office of the Assistant Secretary of Defense, Washington, D. C.
Subject: "The Quality Control Management Policies of the Department of Defense"
Speaker: JOHN J. RIORDAN, Office of the Assistant Secretary of Defense, Washington, D. C.
Subject: "Quality Control Plans and Porcedures in the Department of Defense"
Moderator: W. A. MacCREHAN, Bendix Radio Corporation, Baltimore, Maryland

11. **Speaker:** J. EMERY GOTTSCHALL, Zenith Radio Corporation, Chicago, Illinois
Subject: "Process and Procedures for an Incoming Inspection System"
Moderator: IRVIN W. SCHOENINGER, Globe-Union, Incorporated, Milwaukee, Wisconsin
Speaker: GLENN L. COATES, Hughes Aircraft Company, Culver City, California
Subject: "Product Support Improves Reliability"
Moderator: PAUL G. THOMPSON, Minneapolis-Honeywell Regulator Company, Minneapolis, Minnesota

12. **Speaker:** JOHN W. W. SULLIVAN, American Iron & Steel Institute, New York, New York
Subject: "Non-Random Distribution of Variables: Mechanical Properties of Hot Rolled Sheets in Coils"
Moderator: JOHN V. STURTEVANT, U. S. Steel Corporation, Pittsburgh, Pennsylvania
Speaker: JOHN F. OCCASIONE, U. S. Steel Corporation, Cleveland, Ohio
Subject: "Acceptance Sampling of a Continuously Extended Product: Steel in Wire in Coils"
Moderator: E. M. SCHROCK, American Radiator & Standard Sanitary Corporation, New York, New York

15. **Speaker:** E. E. SCHIESEL, Mattatuck Manufacturing Company, Waterbury, Connecticut
Subject: "Quality Control and Cost Control"
Speaker: HERBERT A. SIMON, Carnegie Institute of Technology, Pittsburgh, Pennsylvania
Subject: "Controlling Inventory and Production in the Face of Uncertain Sales—Theory and Practice"
Moderator: S. H. TROXEL, JR., Ohio Bell Telephone Company, Cleveland, Ohio

14. **Speaker:** DORAIN SHAININ, Rath & Strong, Incorporated, Boston, Massachusetts
Subject: "Breaking Through Industrial Problem Barriers"
Speaker: W. J. MASSER, General Electric Company, Schenectady, New York
Subject: "What Management Expects of the Quality Control Engineer"
Moderator: LEONARD A. SEDER, Consultant, Malden, Massachusetts

KEY—(cont'd)

12. METALS
13. BREWING
14. GENERAL INTEREST
15. ADMINISTRATIVE APPLICATIONS
16. OPERATIONS RESEARCH
17. BASIC TRAINING

REGISTRATION FORM

TENTH ANNUAL CONVENTION, AMERICAN SOCIETY FOR QUALITY CONTROL
PALAIS DU COMMERCE — MONTREAL, CANADA — JUNE 6th, 7th, & 8th, 1956

Please Print This Information will appear on your badge

Name ..... (SURNAME) (FIRST NAMES) (Mr. Mrs. Miss)

Company .....

Mailing Address (HOME OR BUSINESS) .....

Member of A.S.Q.C. Yes ☐ No ☐ Section .....

Number Required		Amount
.....	Complete Registration, including 2 lunches and Thursday Banquet at $20.00 each (without Transactions.)	
.....	As above, except less Thursday Banquet, at $15.00 each.	

SINGLE DAYS

.....	Wednesday, with lunch, at $7.00 each.	
.....	Thursday, with lunch, at $8.00 each.	
.....	Friday, no lunch, at $3.00 each.	

MISCELLANEOUS

.....	Extra banquet tickets, Thursday, at $7.00 each.	
.....	Transactions, per copy, $3.00.	
.....	Ladies programme, at $6.50 each.	
	TOTAL	

Attached is my check for $ ..... payable to the "Tenth A.S.Q.C. Convention".

TECHNICAL SESSIONS

PERIOD

SERIES	I	II	III	IV	V
A					
B					
C					
D					
E					
F					
G					
H					
I					

Please indicate by an X in the appropriate boxes, which sessions you *plan* to attend. This will assist in planning room space.

Detach and mail this form with your check, to:

MR. E. N. BECKETT, Registrar
P.O. Box 717
Montreal, P.Q., Canada

NOTE: If you are making reservations for more than one person, please provide all requested information for each person on additional sheets, using a sheet for each individual.

REGISTER IMMEDIATELY: If, after making reservations, you cannot attend, your registration fee will be refunded provided the Registrar is notified before 12 Midnight, Monday, June 4, 1956.

HOTEL RESERVATION FORM

1956 A.S.Q.C. CONVENTION — MONTREAL, CANADA — JUNE 6, 7, 8, 1956

DAILY RATES — HOTELS	Single Room	Double Room	Twin Bedroom	Suites
Berkeley	$ 6.00 - $ 9.00 ☐	$ 9.00 - $12.00 ☐	$10.00 - $12.00 ☐	$15.00 - $20.00 ☐
Hotel de La Salle	6.00 - 8.50 ☐	9.50 - 11.00 ☐	11.00 - 13.00 ☐	13.00 ☐
Laurentien*	7.35 - 8.35 ☐	10.35 - 11.85 ☐	10.85 - 12.50 ☐	16.70 - 25.00 ☐
Queen's	6.00 - 8.00 ☐	8.00 - 10.00 ☐	9.00 - 12.00 ☐	15.00 - 18.00 ☐
Ritz Carlton	7.50 - 12.00 ☐	10.00 - 18.00 ☐	10.00 - 18.00 ☐	15.00 - 30.00 ☐
Sheraton Mount Royal*	7.35 - 12.50 ☐	9.85 - 13.00 ☐	10.85 - 16.50 ☐	22.00 - 35.00 ☐
Windsor	7.00 - 13.00 ☐	10.00 - 16.00 ☐	11.00 - 16.00 ☐	16.00 - 60.00 ☐

*These hotels have Family Plans.

ARRIVAL DATE: ..... TIME: ..... DEPARTURE DATE: .....

RESERVATION FOR: (Please Print Name and Address)

(1) .....

.....

(2) .....

.....

IMPORTANT:

MAIL TO: (*Not* the hotel)

MONTREAL TOURIST & CONVENTION BUREAU,
1455 PEEL STREET,
MONTREAL 2, P.Q., CANADA.

A limited number of single rooms are available. When the supply has been exhausted, unless a delegate requesting single occupancy supplies the name of another occupant to share a twin-bedded room, the Housing Bureau will make the assignment.

Tenth Annual Convention Exhibit Descriptions

Booth 1

AMERICAN CYSTOSCOPE MAKERS, Inc.

American Cystoscope Makers, Inc., manufacturer of precision optical instruments, extends a cordial invitation to visit their exhibit in Booth #1. A complete line of borescopes will be on display. These will include high power magnifications, ultra-violet and infrared devices. A full selection of optical flats will also be on display.

Booth 3

HAMILTON WATCH CO.

The Allied Products Division of the Hamilton Watch Company is proud to show for the first time its newest acquisition the precision "KWIK CHEK" hole gage. This gage which can be read to the closest 0.0005 is the ideal way for your companies' quality control and production departments to save time and money.

Our main display consists of an operating model of "KWIK CHEK" enlarged 100 times and along with this large gage are smaller displays showing special adaptations of the gage for measuring blind holes, counter sunk holes, tubing, and many others. Descriptive material will be available on all the above displays.

Don't miss the opportunity to see how you can avoid losing those contract bids because of your excessive tooling cost.

Booths 9-10

HUGHES AIRCRAFT CO.

The Hughes Aircraft Company booth will display the CF-100 nose assembly which will have installed in it the Hughes MG-2 fire control system. Other Hughes' products will also be exhibited. A graphic presentation of the vendor reliability program will be featured. The suppliers quality system survey, the performance rating system, and the vendor certification program will be used to emphasize Hughes' attempt to solve the quality problems consistent with the procurement of materials for advanced complex electronic equipment to high reliability standards.

Booth 11

SCOTT TESTERS, Inc.

At Booth #11 Scott Testers, Inc. will have in operation Scott IP-4 inclined-plane tester for tensile, elongation and hysteresis evaluation of textile and elastomeric materials. Capacities of this instrument are: 0 to 1 lb.; 0 to 2 lb.; 0 to 5 lb.; and nine additional 5-lb. increments to 50 lb., giving the tester wide versatility through multiplicity of maximum registrations. Also exhibited will be one of the pressure containers used in the LGP Aluminum Block Oven. The separate containers permit individualized pressure treatment in air or oxygen in accordance with ASTM specifications for elastomers.

Featured also will be: Scott Model J-5 Tensile Tester with "Accr-O-Meter" electric weighing system; Model L-6 for tensile tests of elastomers: NBS Mooney Viscometer: new oven attachment fitting standard Scott machine for hot tensile testing of elastomers; IP-2 Serigraph; SL Strain Tester.

In attendance: Rolla H. Taylor, and representatives of Ross Whitehead & Co., Scott's Canadian agents.

Booths 17-18

SPERRY PRODUCTS, Inc.

Sperry Products, Inc. of Danbury, Connecticut will demonstrate in Booths #17-18 the following ultrasonic, non-destructive testing equipment for flaw detection.

The type UW Reflectoscope for both contact and immersion testing; providing high gain, excellent resolution and a wide range of testing frequencies. Interface gating, variable pulse rate, broad dynamic range, two crystal operation, both RF and video presentations, are a few of the main features.

The type UWA Monitor and B-Scan operating in conjunction with the UW Reflectoscope, conducting automatic and semi-automatic inspection of parts. The UWA takes over the interpretation of information supplied by the UW, presenting this data to the operator in the form of tape or circular recordings, alarm signals, marking of defect and machinery control. This combination unit will be inspecting material immersed in a tank equipped with an automatic scanner.

The UR Reflectoscope with RA Recording and Signaling Monitor, checking a continuous strip of steel for presence of varied defects.

Booth 21

CUSTOM SCIENTIFIC INSTRUMENTS, Inc.

Custom Scientific Instruments, Inc. will display at their booth the following instruments.

The Alundum Hot Plate and Cooling Coils of the Automatic Alundum Guarded Hot Plate Console (Model #140-A) an automatic system for determining accurately the coefficient of thermal conductivity for various insulating materials.

The Pittsburgh Corning Thermal Conductivity Probe utilizes that temperature, at a line heat source in a block, rises by an amount that depends on the thermal conductivity of the material.

The CSI-A Abrader which determines the resistance to abrasion of flat surfaces of materials measured in terms of volume loss.

The Electrostatis Voltmeter for detecting and measuring electrostatic charges generated on moving or stationary equipment or materials.

The CSI Dividing Head (4 inch swing) and comparison Rotary Table (5 inch diameter) are the smallest in production for profiling, drilling, light milling, layout work and engraving.

The Microscope State with the greatest range (3 x 12 inch) without loss of accuracy.

The CSI Templin Calibrator for precision checking of extensiometer strain gages, dial gages, and test indicators.

The CSI Long Life Sieves recommended for routine hourly sieve analysis of cement to reduce testing costs.

Booth 25

MILES REPRODUCER COMPANY, Inc.

Case histories, lectures and dictation may now be recorded at a 60 foot radius with Walkie-Recordall, an 8-lb. self-powered battery recorder-transcriber.

HOTEL RESERVATIONS

Detach the lower third of the opposite page and fill in all the required information. Indicate your preference of hotel and room rate by putting the numerals 1, 2, or 3 in the correct blocks. Mail the completed form to the MONTREAL TOURIST AND CONVENTION BUREAU, 1455 PEEL STREET, MONTREAL 2, CANADA. If all rooms in your selected price classification in the hotels of your choice are taken, your reservations will be accepted at the next higher rate. Should all rooms in all three hotels selected be reserved prior to the receipt of your reservation, the Housing Committee will assign you comparable accommodations elsewhere. Both the hotel accepting your reservation and the Montreal Tourist and Convention Bureau will confirm to you.

IMPORTANT: Reservations mailed to the Convention Bureau must be received not later than May 18th. All reservations mailed so as to arrive after that date should be mailed directly to the hotel of your choice. In such case, there can be no guarantee of reservations.

Confirmed reservations will be held by the hotel only until 6 pm of the arrival date unless later arrival time is specified.

It operates in or out of the closed briefcase, indoors or outdoors, while stationary, walking, riding or flying. The Voice-Activated Self-Start-Stop feature automatically starts and stops the recording from microphone or telephone, thus eliminating supervision and the recording of silent periods. While facilities for transcribing are available, transcription may be eliminated due to ease of handling identifiable, compact, indexed recordings without the delay of rewinding. Up to eight hours of permanent recordings may be accumulated at intervals on an "endless" belt costing 25 cents.

Booth 33

R. J. MacLEOD & COMPANY, Ltd.

R. J. MacLeod & Company Limited, distributor in the Province of Quebec for Friden Calculating Machines will be exhibiting the latest in fully automatic calculators.

The new Friden Square Root Calculator provides fully automatic extraction of square root, plus the many time and labor saving features that are available in all models of automatic Friden Calculators enabling you to do more with less effort.

Friden will also be showing the sensational new Natural Way Adding Machine, an adding machine made to fit the human hand. A visible check dial enables you to prove the figure entered before it is printed on the tape. Light in weight, modern in design, and unsurpassed in quietness of operation, the Friden Adding Machine makes light work of figure work.

Booths 35-36

BAUSCH & LOMB OPTICAL CO.

Bausch & Lomb Optical Co., Rochester, N. Y., will demonstrate its line of optical instruments for quality control. This will include the Company's 10 inch Bench Comparator, Toolmaker's Microscope, Wide Field Tubes, Macroscope, and Stereomicroscopes.

Booth 37

CANADIAN SIZE CONTROL COMPANY

Our display will consist primarily of groups of inspection gages, including reversible plain and thread plugs, plain and thread rings and truncated thread setting plugs; thread and gear measuring wires; Boremaster plain rings, (inexpensive rings to be used as Masters for setting dial bore gages, inside micrometers, etc.)

Our cabinet sets are comprised of reversible plain plug members of any size range, usually 0.20 to 0.500 and 0.500 to 1.000 inches in increments of 0.001 inches. These will be displayed in attractive and sturdy storage cabinets.

We will also have in operation our Size Control Lapping machine which will show how money can be saved by lapping down undersize gages to another size.

We will display prominently our patented Borosilicate gages which have been so successful in inspection of loaded sheel fuzes or in any condition where a non-sparking gage is required. Borosilicate is a grade of Pyrex and has many advantages both in plug and ring gages.

Booth 38

PARKER IMPORTS Reg'd.

Our exhibit will present British-made Precision Instruments, Tools and Gauges, mainly for use in the field of Engineering highlighting the following.

The "Shardlow" range of Micrometers.

The "Shardlow-Imicro" Three Point Internal Micrometers, which is admitted to be the only mechanical internal micrometer giving perfectly repetitive readings in the hands of different operators, these readings being correct to one ten-thousandth of an inch.

The "Shardlow" Vernier Height Gauge with its Satin-Chrome Beam, Vernier and Base and its ball-bearing mounted controls.

The "Comaco" Spring Testing Machines: The No. 1 inch, ¼ oz. to 250 lbs., and the "Minor", ¼ oz. to 25 lbs. tension and compression.

The "Speedy" Moisture Tester, a portable rapid instrument applicable to many materials.

"Harbot's" Gauge Blocks, a full range in various size sets.

The "Wa-co" Precision Drilling Machine for instrument work.

Many other types of measuring equipment will also be shown.

Booths 39-40

MONROE CALCULATING MACHINE COMPANY

Monroe Calculating Machine Company of Orange, New Jersey, will feature their full line of desk calculating and adding machines with representatives who will be glad to explain their many uses in statistical work. They will also feature the newest fully automatic statistical calculator, which has great versatility in statistical analysis work and quality control applications. Be sure to ask the representative for a demonstration.

Booth 47

ELLIOTT SERVICE COMPANY

Featured at the Elliott Service Company's display will be the following management services:

1. Colorful "Quality-Cost" Displays for weekly departmental posting in large and small manufacturing plants to help stimulate employee quality consciousness.

2. A complete bulletin board display service to reinforce management's daily contact with employees. This display features colorful, weekly poster presentations of those subjects requiring plant-wide cooperation, such as Quality Workmanship, Waste and Cost Reduction, and Accident Prevention. Special posters are available for the Textile industry. Bulletin display boards are furnished in silver-gray, hammered-tone, or green baked-enamel finish.

3. Samples of "MANAGEMENT INFORMATION for Foreman and Supervisors," a weekly bulletin covering Quality Maintenance, Waste and Cost Reduction, Human Relations, Supervisor's Personnel Functions, Training and Safety. Also samples of Supervisory Outlines and booklets on similar subjects.

4. Elliott Suggestion System Service samples, which include weekly THINK-Stimulator displays, suggestion panel boxes and monthly Suggestion Bulletins.

Booths 63-64

MARCHANT CALCULATORS, Inc.

An interesting and outstanding example of the successful application of statistical quality control is provided by the production and assembly operations of this pioneer calculator manufacturer. That example will be presented in graphic form by the Marchant exhibit.

The display will include much of interest to QC men—blow-ups of Marchant's quality control charts, photographs of factory scenes showing SQC in action, detailed parts boards, and some of the actual assemblies to which the charts and pictures pertain.

The Marchant line of calculators on display will include a revolutionary new model, the DECI-MAGIC, the first calculator with fully automatic decimals. All entries and all results are automatically pointed off in the keyboard and all four dials. Also on display will be the "Live Tab" Figuremaster, a model widely used in QC activities. Both Marchant models are ideally suited to SQC figurework.

A 52-page booklet forming a case history of Marchant's application of statistical quality control to parts production—virtually a textbook—will be available free of charge, as will a subsequently issued 16-page booklet on the company's complex assembly operations.

Visitors in the Marchant booth will see demonstrations of the specialized use of Marchant calculators for statistical quality control figurework. Marchant has developed comprehensive calculating methods especially for the use of QC personnel. These methods, also, are available in printed form, free of charge.

(Continued from page 19)

WESTERN REGIONAL CONFERENCE AUGUST 20-21

Ken Willhite, chairman of the 1956 ASQC Western Regional conference to be held on Aug. 20-21 at the Statler Hotel in Los Angeles, announced that the conference slogan will be "Increased sales through quality control."

In order to insure a program that will be useful to industry and of interest to the greatest number of people, an advisory group of prominent industrialists have agreed to assist Dr. Harry G. Romig and the rest of his program committee to choose the papers to be given at the conference. These people include Robert J. Cannon, Dale A. Lichty, R. B. Parkhurst, Laurence M. Perrish, John L. Ryde, A. T. Burton, Leonard K. Firestone, George B. McMeans, William P. Lear, Maj. Gen. Leslie E. Simon (Ret.), Paul Piggott, and George Dean.

"FOR MANY ARE CALLED, BUT FEW ARE . . ."

COLUMBUS

Roy B. Cowin, Jr., supervisor of quality control, Kimble Glass Co., Columbus, Ohio, was appointed secretary to fill the unexpired term of Philips E. Porter, who has been transferred to Borg-Warner's Cleveland plant. Phil has faithfully served the section in many capacities and it is with deep regret that we see him leave.

MEMBERSHIP CORNER

Growth in membership of the Rhode Island section has been the result of good planning and hard work by the officers, committees and individuals for the past several years. The old adage of giving "full value" can most certainly be applied in the promotion of the local section. It is well understood by the section that its growth and success depend mainly on an effective program for its members.

Membership increase can be attributed to the following:

- Program
- Pre-meeting round table discussions
- Post-meeting collations
- Educational program
- Extensive mailing list

The programs are carefully selected to maintain interest in local manufacturing and individual needs. Recently, a good subject and speaker resulted in an attendance of 196 members and guests. Each year one of the meetings is devoted to a panel discussion. Questions and problems of interest to the members are discussed and answered by a group of the local experts. A ladies night dinner-meeting was very successful last year and will continue to be a part of the yearly activities.

For 30 minutes prior to each meeting, a so-called round table discussion period is held. Specific problems of the members are presented to the group. This method of helping the individual with his particular needs has proven highly successful. Many members arrive early

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TABLE OF CONTENTS

I. What Is Statistical Quality Control?
II. Benefits Obtained from Quality Control
III. Review of Arithmetic
IV. Construction of the Variable Chart
V. Interpretation of the Variable Chart
VI. Histograms and the Normal Curve
VII. Comparison of Process with Specifications
VIII. Averages versus Individuals
IX. Simulating a Process
X. Summary of the Variable Chart
XI. Introduction to Attribute Charts
XII. Constructing the p Chart
XIII. Simulating a Process
XIV. Other Attribute Charts
XV. Introduction to Acceptance Sampling
XVI. Mil-Std.-105A.

to participate in the discussions or merely to obtain some pointers in quality control. These sessions are conducted by Cliff Kennedy.

Post-meeting gatherings give the members an opportunity to further discuss the evening's subject with the speaker or other members. This is an informal affair during which refreshments are served. These gatherings also offer each member an opportunity to meet others in the section and thereby promote a feeling of good will among the members.

Each year the local section conducts an educational series on quality control methods and administration. Both the introductory and intermediate courses are given yearly. The courses have always received widespread support from companies and individuals. This is an important means of promoting membership and thereby continuing the enroller's interest in quality control after completion of the course. Consequently, each year many new members are added to the membership rolls.

The sectional mailing list includes members, individuals and companies. In this manner, these various groups are notified of meetings and other items of interest in quality control. This does not produce spectacular results in membership growth, but new people are acquired through this method each year. A campaign to insure renewal of the old members has been set up by the membership committee and has proven quite successful.

This summary has pointed out the various methods used by the Rhode Island section in promoting and stimulating interest in quality control and sectional membership. The "formula" was not developed overnight; rather, it has been the sectional policy for some years. It is successful because the yearly activities mentioned previously provide the best type of advertising. Its effect on the section's progress is similar to a chain reaction. With these aims in mind, the section should continue its considerable growth in the future.

(The following is from Membership Chairman Harmon S. Bayer.) In the January issue under "Significant Differences" the South Texas section included some facts about their membership drives which are worthy of note. In general, this vital section analyzed its membership picture, set its goals, worked with the Texas Manufacturing Association and through a committee did an aggressive job of contacting prospective members and company officials to develop new members. A special drive was made to build up renewals. Section chairman Jerrold Moyer assigned members of the executive committee to contact non-renewing members personally and to secure renewals or find out "why."

We are indebted to publicity chairman W. F. Winter for this information and congratulate chairman Moyer and his group. This is a small but wide-awake group; can your section use these techniques? They have worked for others.

"SIGNIFICANT DIFFERENCES"

Congratulations to Jim Mitchell, director of quality control at Avondale Mills, who has been promoted to assistant secretary of the corporation. Avondale Mills is one of Alabama's large and well known textile corporations. Jim is a member of the Birmingham section.

The Racine section notes with deepest regret the death of one of its charter members and its first recording secretary, Mr. Clem Ravenscamp. At the time of his death Mr. Ravenscamp was a Senior member of the Society and assistant chief inspector at the Massey Harris-Ferguson Co. in Racine.

The program of applied and mathematical statistics at Rutgers State University has announced a graduate-assistantship in the department for 1956-57. Candidates for the position should have had at least one year experience in applying statistical analysis or statistical quality control in industry, and undergraduate training in engineering or the physical or biological sciences. The assistantship carries a stipend of $1560 and tuition.

Course work in applied and mathematical statistics for the master's degree may be completed at Rutgers in a regular academic year, Sept. 15 to June 1. The student will elect courses both in theory and in application from the course offerings.

Application forms and additional information about graduate-assistantships or graduate study in applied and mathematical statistics at Rutgers may be secured from Professor Ellis R. Ott or Professor Mason E. Wescott, Rutgers State University, New Brunswick, N. J.

WALTER SHEWHART RETIRES

Here is an historic place card—the one used at the retirement luncheon held for Walter A. Shewhart at the Bottle Hill Tavern in Madison, New Jersey, Mar. 8:

Mr. .....

Fruit Cup
Veal Scallopini
Frozen Eclair

Some 86 members of the Bell Telephone Laboratories and friends gathered from the Murray Hill, Whippany, and New York Locations to do honor to the man generally spoken of as the "Father of Quality Control." Our guests included Professor Ellis Ott of Rutgers and Mr. John Snyder of John Wiley & Sons. Paul Olmstead acted as master of ceremonies. Dr. Ralph Bown, retired Vice President of Bell Laboratories, welcomed the guest of honor into the Life Member fold of the Telephone Pioneers. Harold Dodge gave a capsule recital of the many contributions of Dr. Shewhart's long and brilliant career, and noted personal highlights in his 38 years of service in the Bell System. Milton Terry spoke on some of Dr. Shewhart's more recent contributions in the research work of the Laboratories. Following the luncheon a reception was held at the Murray Hill Laboratories. Dr. Shewhart will remain in Mountain Lakes, where he has lived for over thirty years, and will continue as Editor of the Wiley Publications in Statistics in collaboration with Professor Sam S. Wilks of Princeton.

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The men who make the ANACONDA Magnet Wire you use in rewinding customers' motors are held strictly accountable for its quality. Meetings, such as the one shown above, are held daily at Anaconda's modern mills to assure that production never strays from the most exacting standards in the industry.

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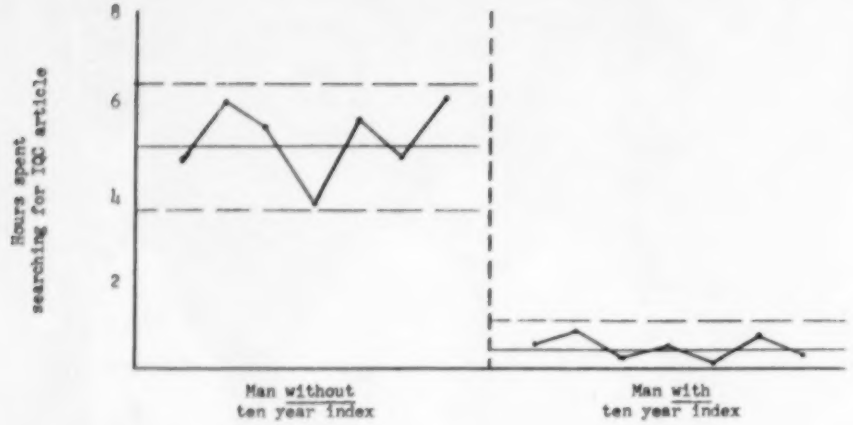

The Index to Volumes I-X of *Industrial Quality Control* is one of the best bargains a man can get for half a dollar. In time alone you will be repaid many times over for the $.50 spent—and what about all of that good information appearing in IQC articles that you have forgotten?

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Management's Corner

J. M. JURAN, *Editor*

Committees have been the target of much abuse, most of it earned. The following rules were of great aid to an actual committee which faced an uncommonly difficult job in group study of a problem in product yields.

Quality Improvement Steering Committee

Rules

A. Premiums

1. Absence
   Absence constitutes non attendance from a regularly scheduled meeting between the starting time and final adjournment. Premium $0.50.
2. Tardiness
   Tardiness constitutes absence at official starting time up to and including 10 minutes. Absence beyond 10 minutes see A-1. Premium $0.25.
3. Change in scheduled time and/or place of meeting. The scheduled time and/or place may be changed at the discretion of any member. Premium $0.25.
4. Minutes, reports, data
   I—Minutes of previous meeting must be in the hands of Steering Committee members within 2 working days after the meeting. Premium in case of default $0.25.
   II—Reports, data
   It is the responsibility of all members to bring to all scheduled meetings minutes of the last meeting any and other reports and data pertinent to the discussion. Premium in case of default $0.25.

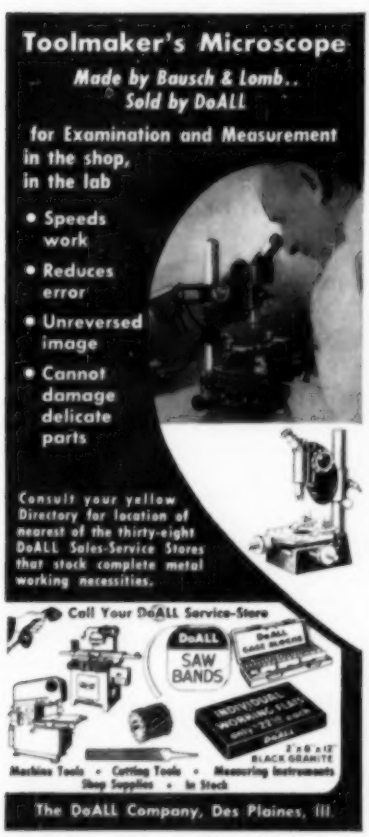
B. Yields

1. A downward change in yield of 1.0 percent or more in any one week requires a premium of $0.25 from each member.
2. An upward change in yield in intervals of 2.0 percent starting at the level of 80.0 percent requires a premium of $1.00 per interval from the Production Superintendent.
3. An upward change in yield in intervals of 5.0 percent starting at the level of 80.0 percent requires a premium of $3.00 per interval from the Vice President in charge of manufacturing.

C. Conduct
   Members are responsible for conducting their activities in a manner required of members of the Engineering profession.

D. General Qualifications

1. The gold commemorative timepiece of the Production Superintendent shall be used as the official time for starting of regularly scheduled meetings.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Here's a compact, portable and extremely accurate instrument for comparing surfaces and finishes with your "reference standard." The man at the machine, the foreman and quality control man can tell instantly if the work is rougher or smoother than standard . . . guesswork is eliminated, time is saved and quality is kept at a high grade. The Surface Comparator is the first instrument of its kind . . . the perfect answer to metal surface comparison inspection. Net price, $30.00.

WRITE for complete details. Bausch & Lomb Optical Co., 50204 Lomb Pk., Rochester 2, New York.

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2. Absence or failure of said timepiece requires a premium of $0.25 from the Production Superintendent.
3. No disbursement shall be made from the treasury except when unanimously approved by all members.
4. Disbursements shall be allocated in proportions not in excess of one seventh per member.
5. The treasury report is open to inspection by any member. Any irregularity requires a premium of $0.25 to be paid by the treasurer.
6. Amendments to the aforegoing rules may be made by a clear majority of members present at a regularly scheduled meeting.

Bibliography

JOSEPH MOVSHIN, *Editor*

Assisted by the Editorial Committee, St. Louis Section, ASQC

APPLICATION— TEXTILE INDUSTRY

MILL TESTING FOR OPENING AND PICKING, by Norbert L. Enrick
(Modern Textiles Magazine—v. 37, n. 1, Jan. 1956, p. 34-38)

This is the first of a new series of articles on quality control under the heading of "Mill Test Procedures." The first of these describes the actual collection of test data for opening and picking (two steps in the mill production in a spinning and weaving mill). Included are general rules on the frequency of testing as well as of several specific checks to be made, and a form for recording the results of these checks. The introduction to this series states that this new series of articles is designed to serve those mills who do not now have written test procedures.

TESTS FOR BETTER CARDING, by Norbert L. Enrick
(Modern Textiles Magazine—v. 37, n. 2, Feb. 1956, p. 34-51)

The second in the series of mill test procedures, as did the first, provides a detailed outline of a series of tests for the carding operations. Included for each particular test, is such information as the purpose, equipment, sampling procedure, evaluation, and a form for recording the results. The following test procedures are specifically described:

Card Web Nep Count
Card Fly Waste (or Droppings) Test
Card Flat Strips Quality Test
Sliver Can Contents Check

APPLICATION— METALLURGICAL INDUSTRY

STATISTICAL METHODS IN METALLURGY, by H. R. Evans
(Metallurgia—v. 52, n. 311, Sept. 1955, p. 107-11)

Several special techniques applicable to the metallurgical industry are described in this article. These include the problem of validity tests, the interpretation of correlation data and problems of irreproducibility. Examples include the distribution of pit depths on corroded pipes and the use of histograms and other frequency distribution diagrams such as the ogive to represent data. Suggestions for the improvement of established procedures and the use of these tools are given. The use of Tchebycheff and Camp-Meidell inequalities are discussed.

APPLICATION— METAL WORKING

CONTINUOUS SIZE CONTROL, by Avrel Mason, Chief Engineer, Cargill Detroit Co.
(Production—v. 37, n. 3, Mar. 1956, p. 84-86)

This article discusses "size scatter" in the manufacture of bearings. Basically, the problem is to distinguish between normal variation with a given setting and the continual changes in size that occur as a grinding wheel wears. A continuous control system under which each piece is gaged automatically is employed. On the basis of statistical scatter diagrams that are based upon dimension versus time, a control unit is devised. This unit operates a feed mechanism which distinguishes between normal "size scatter" and wheel wear which is automatically adjusted by the machine. The separation of "size scatter" from wear patterns is illustrated on a chart which shows both a continuous control effect and the limits outside the normal scatter band.

APPLICATION— MISCELLANEOUS

INSPECTING INJECTION-MOLDED NYLON GEARS, by L. D. Martin, (Gear Consultant, Rochester, N. Y.)
(Machinery—v. 62, n. 4, Dec. 1955, p. 162-165)

A mechanical inspection of the geometric features of gears is stressed in this article. Description of the equipment as well as procedures outlined.

ENGINEERING & EXPERIMENTS

STATISTICAL TECHNIQUES FOR REDUCING THE EXPERIMENTAL TIME IN RELIABILITY STUDIES, by M. Sobel
(Bell System Technical Journal—v. 35, n. 1, Jan. 1956)

In considering reliability studies, it is necessary to determine from a relatively small number of items what the life cycle, or a period during which no failures occur, may be. At the same time, it is necessary to reduce the average experimental time as much as possible during which these factors will be determined. Three statistical techniques for doing this are discussed.

DIMENSIONS HAVE DIRECTION, by L. C. Lander, Jr., Chairman, Industrial Engineering Department, General Motors Institute
(Production—v. 37, n. 3, Mar. 1956, p. 59-61)

This article describes the problem of indicating clearly on a blueprint the point from which measurements are to be made to properly indicate the design engineer's thoughts with regards to the

Selected references in the Bibliography of *Industrial Quality Control* are obtained from the following sources:

The International Statistical Institute, *International Journal of Abstracts on Statistical Methods in Industry.*

relationship of the dimensions. This is primarily done by single dimensional arrows indicating a coordinate axis system from which measurements are located. This article praticularly refers to problems in castings and considers three fundamental problems:

1. All machining dimensions must be specified in relation to each other.

2. All casting or forging dimensions must be specified independently of the machining dimensions.

3. The machining dimension system and casting dimension system must be tied together so that all surfaces to be machined fall within the structure of the casting.

MANAGEMENT & PERSONNEL, GENERAL

TRAINING SALES ENGINEERS TO SELL QUALITY, by Bernard Lester (Management Consulting Engineer)

(Machinery—v. 62, n. 3, Nov. 1955, p. 197)

It is an important problem for the sales engineer to stress quality rather than price. This article briefly outlines some of the considerations and points to be stressed to emphasize quality in sales.

THE ASSIGNMENT OF OPERATORS TO SERVICE AUTOMATIC MACHINES, by Robert N. Fetter

(The Journal of Industrial Engineering—v. VI, n. 5, Sept.-Oct. 1955, p. 22-30)

The waiting line theory is applied to the problem of assigning work in the servicing of automatic equipment. The economics of the situation, problem of waiting time, etc., are described in detail. A series of "Tables of Waiting Time and Machine Availability for Selected Servicing Constants" are given. These constants are used in the formulas which are developed to select the best overall program for a particular situation.

THE INDUSTRIAL ENGINEERING APPLICATION OF COMMUNICATION - INFORMATION THEORY, by Allen B. Rosenstein (Department of Engineering, University of California, Los Angeles) (The Journal of Industrial Engineering—v. VI, n. 5, Sept.-Oct. 1955, p. 10-21)

This lengthy article reviews in detail the Operations Research and automation concepts of communication theory and indicates its value to the industrial engineer. Through this mathematical language and consideration of the statistical performance of human and mechanical components, the industrial engineer is able to develop more accurate ideas of performance. Many of the basic communication theorems are described, and the agreement of experimental data with this theory is pointed out. The use of the mathematical techniques which lend themselves easily to extended model theory are described. The techniques are presented to the industrial engineer with the idea that human performance becomes measurable and predictable through these techniques but that the development of the use of this tool will be slow because of the changes necessary in thinking and approach.

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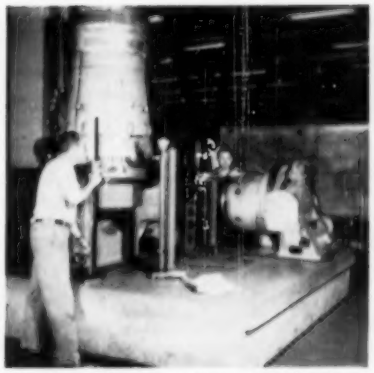

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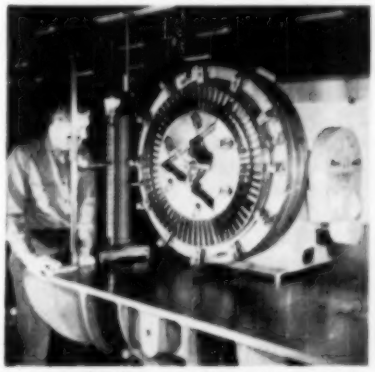

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INDUSTRIAL MANAGEMENT

COST YARDSTICKS, by Guerin A. Bernardin (Vice President, Bernardin Bottle Cap Company, Inc., Evansville, Ind.)
(Production—v. 36, n. 4, Oct. 1955, p. 87)

This article describes simple graphical statistical techniques to compare actual with expected costs. On the basis of a scatter diagram, a simple correlation is established by the free hand drawing of a curve representing the variation of cost with production. These provide the basic standards for any production level which can be checked against the actual either in terms of cost production, payroll cost per thousand, etc. Statistics, as such, are not calculated and the method relies upon the visual examination both to develop the "yardstick" and to compare the "yardstick" with the actual.

TIME FOR A TIME UTILIZATION SURVEY, by F. S. Macomber
(Factory Management and Maintenance—v. 113, n. 5, May 1955)

"Work logging" is described as an application of work sampling technique to maintenance manpower utilization. Through this sampling technique, it is possible to reduce delays and lost time in maintenance work.

INVENTORY CONTROL PROBLEMS
(Research for Industry [Stanford Research Institute News Bulletin] Nov. 1955)

The Stanford Research Institute and the Southern Pacific Company develop an inventory control system on the basis of optimum limit equation. Considering lead time, unit cost, and estimated demand, upper and lower stock control limits were developed on the basis of a total cost equation and the idea of reducing total supply costs to a minimum. The results were checked by a test run through reworking 20 months supply and demand activity.

MISCELLANEOUS

QUALITY CONTROL AND APPLICATION TESTS FOR PLASTISOLS, by A. C. Wasser
(Products Finishing—v. 20, n. 1, Oct. 1955, p. 60-66)

This article describes the control laboratory at the United Chromium Division of Metal Thermit Corp. This laboratory is responsible for the control of quality of all incoming raw material through appropriate laboratory tests and inspections as well as production quality control. Of prime responsibility in this laboratory is the establishment and maintenance of a master formulation book.

INSPECTION AND TESTING — FORUM ON TECHNICAL PROGRESS.
(Steel—v. 138, n. 1, Jan. 2, 1956, p. 284-292)

This article presents numerous short opinions by various experts on the future of several of the non-destructive testing methods. This includes X-ray ultrasonic testing, micro-hardness testing, etc.

THE COST QUESTION
(Production—v. 37, n. 3, Mar. 1956, p. 66-71)

Cost is discussed from the standpoint of purchased parts, mechanization, material handling, and quality. The effect of vendor quality and the measurement thereof is considered. This is a round table discussion with views of various individuals expressed briefly.

MAKING AERONAUTICAL STANDARDIZATION TICK, by C. E. Mines, Chairman, SAE Aeronautics Committee
(SAE Journal—v. 64, n. 4, Mar. 1956, p. 22-25)

The history of the Society for Automotive Engineers in the development of aeronautical standardization is reviewed. In addition, four basic principles governing the SAE program are indicated:

1. Industry-Government Responsibilities Spelled Out.
2. Let Manufacturer Use His Judgment.
3. Quality to Suit Service Need.
4. Standards Dynamic, not Static.

Some of the problems with respect to the present SAE aero standards are also indicated.

SEQUENTIAL SAMPLING

SEQUENTIAL TWO SAMPLE LIFE TEST, by R. Epstein
(Franklin Institute Journal—v. 260, n. 1, July 1955, p. 25-30)

This article describes an application of sequential sampling to the problem of selecting the better of two lots of tubes. In this particular situation, the lot with the longer life is to be selected. Based on an assumption of the nature of the life distribution, a sequential plan is developed for the situation.

STATISTICS

STATISTICS AND OBJECTIVE ECONOMICS, by Morris A. Copeland
(Journal of the American Statistical Association—v. 50, n. 271, Sept. 1955, p. 639)

THE APPLICATION OF SAMPLING PROCEDURES TO BUSINESS OPERATIONS, by Howard L. Jones
(Journal of the American Statistical Association—v. 50, n. 271, Sept. 1955, p. 763)

ON THE RELIABILITY OF RESPONSES SECURED IN SAMPLE SURVEYS, by Robert Ferber
(Journal of the American Statistical Association—v. 50, n. 271, Sept. 1955, p. 788)

THE EFFICIENCY OF DOUBLE SAMPLING FOR ATTRIBUTES, by H. C. Hamaker and R. van Strik
(Journal of the American Statistical Association—v. 50, n. 271, Sept. 1955, p. 830)

TRUNCATED BINOMIAL AND NEGATIVE BINOMIAL DISTRIBUTIONS, by Paul R. Rider
(Journal of the American Statistical Association—v. 50, n. 271, Sept. 1955, p. 877)

DoALL MONOLIGHTS
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for use with Optical Flats
Millionths-inch measurement of flatness, size, parallelism
5" size covers 14" working area.
• Powerful light creates sharp fringe lines.
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See one at your plant—See classified directory for your local DoALL Service-Store with complete stocks of gages and metal-working necessities.
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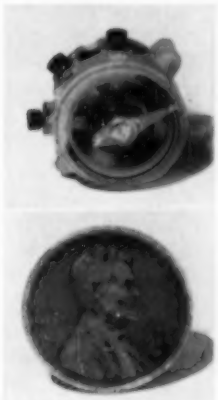
HOW 3-D MICRO-VISION HELPS FAIRCHILD

manufacture world's tiniest production-run potentiometer



In a case less than ½" in diameter, 35 sub-miniature parts are precision-assembled; hair-thin springs are welded into fine slots. This tiny unit, designed and developed by the Guided Missiles Division of Hughes Aircraft Company, is a sensing and controlling element for aircraft and missiles; critical tests must assure highest mechanical and electrical efficiency.

Fairchild Camera and Instrument Corporation attributes the efficient mass-production of this unit to the use of Bausch & Lomb Stereomicroscopes—in assembly, inspection, and quality control. "Operators have both hands free and use both eyes to obtain normal, three-dimensional vision magnified to the required power—with high efficiency and operator comfort."

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THE DISTRIBUTION OF THE PRODUCT OF MAXIMUM VALUES IN SAMPLES FROM A RECTANGULAR DISTRIBUTION, by Paul R. Rider
(Journal of the American Statistical Association—v. 50, n. 272, Dec. 1955, p. 1142)

THE DISTRIBUTION OF THE QUOTIENT OF MAXIMUM VALUES IN SAMPLES FROM A RECTANGULAR DISTRIBUTION, by V. N. Murty
(Journal of the American Statistical Association—v. 50, n. 272, Dec. 1955, p. 1136)

A STUDY OF INDUSTRIAL USE OF PROBABILITY STATISTICS IN THE PHYSICAL SCIENCES, by Julian H. Toulouse
(Journal of the American Statistical Association—v. 50, n. 272, Dec. 1955, p. 1014)

THE ANALYSIS OF VARIANCE: A GRAPHICAL REPRESENTATION OF A STATISTICAL CONCEPT, by Benjamin A. Barnes, Elinor Pearson, and Eric Reiss
(Journal of the American Statistical Association—v. 50, n. 272, Dec. 1955, p. 1064)

NOMOGRAPH FOR COMPUTING MULTIPLE CORRELATION COEFFICIENTS, by Frederic M. Lord
(Journal of the American Statistical Association—v. 50, n. 272, Dec. 1955, p. 1073)

THEORY & APPLICATION, GENERAL

THE RELATIONSHIP OF NONDESTRUCTIVE TESTING TO QUALITY CONTROL, by Brigadier General William P. Farnsworth (USAF Auditor General, USAF, Washington, D. C.)
(The Journal of the Society for Nondestructive Testing—v. 13, n. 6, Nov.-Dec. 1955, p. 28-34)

General Farnsworth discusses the importance of quality control to military procurement. In this, specifically, the part played by non-destructive testing in the management control of quality and the relationship between sampling to non-destructive testing. Basically, from the Department of Defense standpoint, quality control is defined as the overall management function to assure conformance of the material to various specifications, etc. In addition to the basic attitude of the Department of Defense, the following areas are briefly discussed:

A) Quality in procurement, storage and maintenance
B) Prevention and conservation
C) Development of improved techniques
D) Sampling procedures for a non-destructive test program
E) Sampling inspection by attributes
F) Continuous sampling plans
G) Sampling by variables

OPERATIONS RESEARCH

OPERATIONS RESEARCH: SCIENTIFIC APPROACH TO MANAGEMENT, by M. Goland & E. Koenigsberg)
(Chemical Week—v. 76, n. 21, May 21, 1955)

This article provides a general discussion of operations research primarily from a management standpoint. Typical situations which may be solved by the application of linear programming, gaming theory, Monte Carlo method and queuing theory, are indicated. Some considerations in the development of an operations research team in a particular plant are presented.

WHAT *IS* OPERATIONS RESEARCH? by Annesta R. Gardner (Industrial Editor)
(Dun's Review and Modern Industry—v. 66, n. 6, Dec. 1955, p. 46-47)

This article quotes the opinions of numerous industrial leaders on what is operations research and how it may be used. Opinions on how it fits into an organization and limitations are also given. A very interesting list showed applications under the following three categories:

Most likely to succeed
Less certain of success
On the middle ground (neither "most successful" nor "least successful"—but worth a try)

REPORTED— NOT REVIEWED

STATISTICAL ASPECTS OF THE DESIGN OF EXPERIMENTS, by S. S. Wilks
(Proceedings American Philosophical Society—v. 99, June 15, 1955, p. 169-173)

What's New?

ROY A. WYLIE, *Editor*

When inquiring about "What's New?" items, please mention INDUSTRIAL QUALITY CONTROL

Baird Associates of Waltham, Mass. announce the new Semiconductor Resistivity Test Set Model JN1. The Test Set is especially designed to measure the resistivity of germanium samples. The probe assembly can also be adapted for measurement of silicon. It covers a range of resistivity from 0.1 to 100 ohm-centimeters with a measurement accuracy of ± 5 percent. Model JN1 embodies the "four-point-probe" method for precise testing of semiconductor resistivity. Four electrodes in a line are placed in contact with the face of the material to be tested. A known current is passed through the sample between the outer electrodes. The resulting floating potential across the inner electrodes is proportional to the resistivity of the sample. In order to eliminate any disruption of the normal voltage and current gradients surrounding the electrodes, a null method is used. A potentiometer with a d-c null detector is connected to the inner probes. When a null occurs, the bucking voltage is equal to the floating potential across the inner probes and, therefore, proportional to the resistivity of the sample. Model JN1 consists of three separate pieces of equipment; the Probe Assembly Model JP1, Germanium Resistivity Test Unit JQ1 and the null detector. The Probe Assembly contains four tungsten probe points on ground steel slides in ground steel ways, backed by an elastomer block. The probe carriage is driven up and down by a gear-head motor. Spring loaded electrodes, reproducible loading and uniform approach rate

make possible highly reproducible results. The Germanium Resistivity Unit Model JQ1 provides a source of fixed current for the outer electrodes of the Probe Assembly. Coarse and fine adjustment of the current from the isolated, internal-battery source are provided in addition to metering. A timing circuit prevents overheating of the sample. Resistivity is read directly from the final potentiometer setting.

* * *

A new method of control in manufacturing processes through the use of wavelength absorption from a continuous flow of materials or finished products is now possible by the use of SPECTROSTATS. These instruments have been developed by the **Kaye Development Co.**, South Norwalk, Conn. Gases, liquids, slurries, sheets or a flow of unit solids may be monitored by the Kaye method which can sense deviation in absorption bands within pre-selected limits. The SPECTROSTAT consists of an integrated group of components which may be assembled to perform the function of absorption band deviation measurement in a number of different ways. Observations may be made in the range from ultra-violet through near infra-red. The 50 millivolt proportional output provides direct process control, or deviation may be indicated by a visual and/or audible warning. Operation of the SPECTROSTAT depends on a sensitivity to an actual change in absorption bands, achieved by splitting the beam between two or more detectors of different spectal sensitivity. It is possible to monitor simultaneously color and turbidity or two or more components of a stream by use of the single instrument. Sensing elements may be operated remotely from the indicating unit. Among the uses for the SPECTROSTAT are: control of process factors, pipeline batch metering, automatic mixing of additives, detection of water vapor in gas, automatic replenishing, product sorting and titration.

* * *

A new gaging fixture for the accurate, positive checking of shoulder squareness relative to the centerline of product threads has been announced by **Pratt & Whitney Co., Inc.**, West Hartford, Conn. The fixture is designed to be used wherever extreme accuracy is required in threaded parts. It uses readily interchangeable roll holding plates and

Now! Closer gage block tolerances give you up to 75% longer wear life at no increase in price!

Ellstrom Standards are now produced and unconditionally guaranteed to specified millionths well within the following improved gage block tolerances:

"W" Working Accuracy Blocks: +.000008", —.000002" per inch of length, with flatness and parallelism held within .000006".

"I" Inspection Accuracy Blocks: +.000004", —.000002" per inch of length, with flatness and parallelism held within .000004".

In addition to providing finer accuracy at no increase in price, these Ellstrom Standards also give you up to 75% longer wear life. For, by reducing the allowable "minus" deviation, you get an additional guaranteed wear allowance of from 2 to 6 millionths of an inch, as compared to common industry standards, before the blocks need be considered worn undersize.

Ellstrom Standards are furnished in 28 basic sets of from 8 to 92 blocks in both rectangular and square styles. Individual blocks are also available in sizes ranging from .010" to and including 20.000" to meet your particular needs. Send for complete specifications and prices today!

Set No. 35 R: "W"—$185.80; "I"—$280.50

Set No. 81 SA: "W"—$545.60; "I"—$764.35

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DEARBORN GAGE COMPANY
"Measuring in Millionths for Three Generations"
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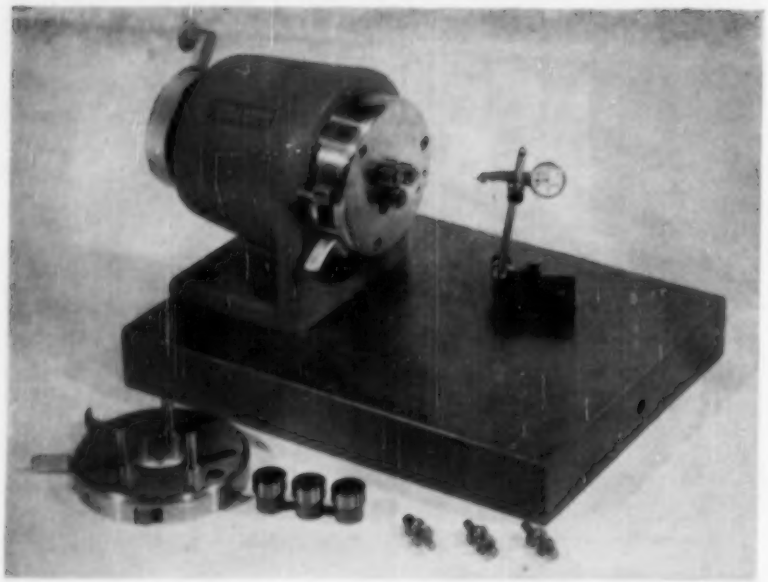
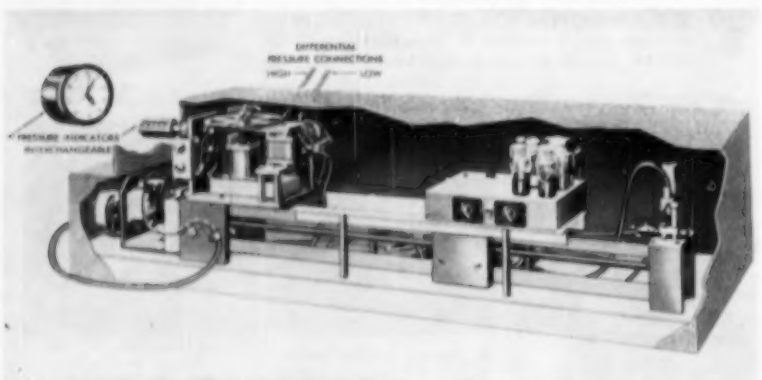
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES AND CANADA

- Ellstrom Internal Setting Gage—12" range: $185.00
- Ellstrom Rectangular Gage Block Accessory Set: $288.95
- Ellstrom Master Sine Bar "W" Accuracy: $112.50 "I" Accuracy: $152.75



interchangeable gaging rolls. Range is from ¼ inch to 1½ inches thread diameter. Inherent accuracy is approximately 0.0002 inch total indicator reading, at 1½ inches diameter. The fixture consists basically of a gaging head mounted on a precision aligned spindle. Special ball thrust bearings insure squareness. In operation, a lever arm is actuated, opening the gaging rolls carried on the gaging head. The product thread is placed on the rolls and the arm is released. The spindle and head are rotated by means of a hand crank and errors in squareness are easily read in terms of total indicator reading on the indicator dial. The Squareness Thread Checking Fixture is supplied mounted on a surface plate, for use on a bench or at a machine.

★ ★ ★



An automatic beam balance pressure tester, which takes up where the barometer of manometer leave off (100 inches of mercury) has been introduced by **Ideal-Aerosmith, Inc.**, 12909 South Cerise Avenue, Hawthorne, Calif. This bench model unit provides an accurate, repeatable, compact method for measuring either absolute or differential pressures and may be used in the laboratory or on the production line. The automatic beam balance pressure tester gives automatic indication of the difference between two pressures, one being known. The mechanism used to sense this difference is a piston centered in a cylinder with one face exposed to the known pressure, and the other exposed to the pressure in question. It is similar to a "dead-weight" tester except that the opposing force to the variable load is provided by a beam with a traveling weight to give accurate balance of the opposing forces. High sensitivity is achieved by a photoelectric signal and control of the weight position through an amplifier and servo-motor driven precision leadscrew. Elimination of friction in both the pressure cylinder and the beam pivots further enhances the overall accuracy and sensitivity to where "Manometer" accuracy can be obtained in pressure ranges up into hundreds of pounds per square inch.

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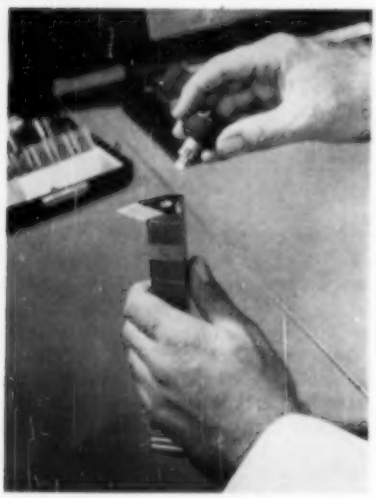

The DoALL Company, Des Plaines, Ill., recently announced an addition to their line of square gage blocks and accessories in the form of a specially designed Torque Screw Driver. Under most existing systems for assembling square gage blocks into working gages, tie rods are passed through the holes in the center of the block and the stack is clamped by means of screws which fit internal threads at each end of the tie rods. Tightening the screws with an ordinary screw driver has led to inconsistency in dimensions since the ultimate clamping pressure is dependent upon the unreliable element of "feel". Too much pressure causes distortion of the blocks with consequent errors in dimension beyond the rated tolerance of the blocks. The DoALL Torque Screw Driver for square gage block assemblies "slips" at a fixed torque. When used to tighten tie rod screws in a stack of square gage blocks, it develops a pressure which has been established by laboratory test as sufficient to maintain a rigid assembly of wrung blocks but is, at the same time, not great enough to cause distortion. Because direct clamping pressure sufficient to wring the blocks would result in distortion, the Torque Screw Driver is intended for use a f t e r the blocks have been cleaned and wrung by hand in the accepted manner. This procedure of assembling the blocks, plus the use of the DoALL Torque Screw Driver, makes it possible to achieve consistent repeat accuracy in assembling and re-assembling stacks of the same dimension. The s c r e w

driver is turned clockwise to apply the proper pressure to the assembly. When turned counter-clockwise, the nib locks to the knurled handle so that the clamping screw may be loosened. The screw driver is designed for use with any of the standard square gage block accessory systems being marketed today.

★ ★ ★

The X-Ray Dept., General Electric Co., 4855 Electric Avenue, Milwaukee 1, Wis., have recently announced a new x-ray inspection system which produces an image that is 10,000 times brighter than that on the conventional fluoroscopic screen. This intensified image is presented on a TV screen for easy—and if desired, remote — viewing in full daylight, simultaneously, by any number of persons. This intensified TV image makes possible fluoroscoping in broad daylight, without the need for placing inspectors in stuffy, darkened rooms, and requiring them to dark-adapt their eyes, or using high x-ray intensities to achieve a visible image. Not only can the image be brightened, but it can also be magnified in size many-fold, limited by the size of the TV viewing tube, thus further enhancing inspection. The G-E system produces an image directly, by electronics, from the x-ray source — eliminating the complexities resulting from converting the x-ray image into a light image before intensifying it. The x-ray beam passes through the object being examined and strikes a photoconductive layer of lead-oxide which has been "painted" on the inside of a special 8½ inch diameter TV pick-up tube. A low-speed electron beam "reads" the latent image on the lead-oxide layer by scanning it and presents the image — electronically amplified — on a TV viewing tube similar to the type used in a conventional TV receiver. Because the image is intensified electrically, the original x-ray intensity and voltage required can be greatly reduced, thus cutting down on the hazard to inspecting personnel and therefore requiring less protective shielding. Because the image may be displayed on a TV set, a number of conventional TV "slave" receivers can be coupled to the "master" receiver and viewed at various locations throughout a plant at any distance from the inspection area. In addition, the signal created by the scanning beam can be recorded on magnetic tape and kept for a permanent record or the image may be photographed from the viewing screen. The contrast sensitivity of the new system is roughly comparable with that of conventional fluoroscopy or around six to eight percent. In addition, the contrast of the image can be varied electronically, as on a conventional TV receiver, to suit the needs of the viewer. The new G-E system responds to x-rays generated at voltages as high as 1,000,000 thus promising to make possible the remote visual inspection of dense products, such as those made of steel. This will prove of great value in those industries where speed of examination and lower inspection costs are paramount, and it is not essential to make a permanent record on x-ray film.

★ ★ ★

Size Control Co., 2500 W. Washington Blvd., Chicago 12, Ill., are now marketing set masters for checking micrometers. The unit consists of six individual cylinders, bolted together for convenience, in sizes from 1 inch through 6 inch in steps of 1 inch. Each master is calibrated and the actual size is marked on each section to four decimal places. A companion to the Micrometer Set Master is the Boremaster Plain Ring Gage Set used for setting dial bore gages, I.D. Micrometers, etc. The low cost rings are accurate to 0.0001 inches or less for roundness, straightness and taper with tolerance of +0.0002 inches from basic size. Actual size is stamped to four decimal places on each ring. Set #B-1

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A size and type for every job
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SIMULTATORS
... To demonstrate control chart plotting and shift of distribution pattern.

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includes rings in steps of 6¼ inch, from 0.500 inches to 1.000 inches inclusive. Special sets will be made to order.

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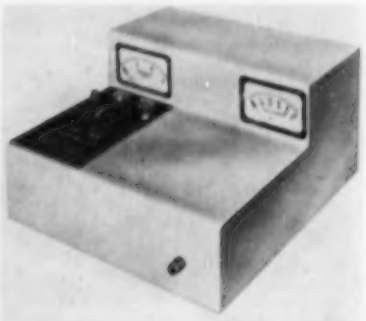

John Chatillon & Sons, 85 Cliff Street, New York 38, N. Y., recently announced the Chatillon Type #300 Running Torque Testers and Dynamometers. These units are furnished in three different models to test up to ¾ HP motors, and have an accuracy of ¼ percent up to speeds of 10,000 RPM. The Dynamometers are housed in a case measuring 22 inches wide by 28 inches high by 15 inches deep, and the torque dial measures 10 inches in diameter. The torque measuring component is built around the Chatillon Iso-Elastic Springs which automatically compensate the unit for temperature variations from zero to 150 degrees F. Hysteresis brakes apply a load to the motor undergoing test and dissipate the heat developed by the motor. Hysteresis brakes have high power absorption, low inertia, and stepless application of torque. Torque can be applied and held at zero RPM which allows a unit to be used for start and stalling torque as well as for static torque testing of torque wrenches and screw drivers.

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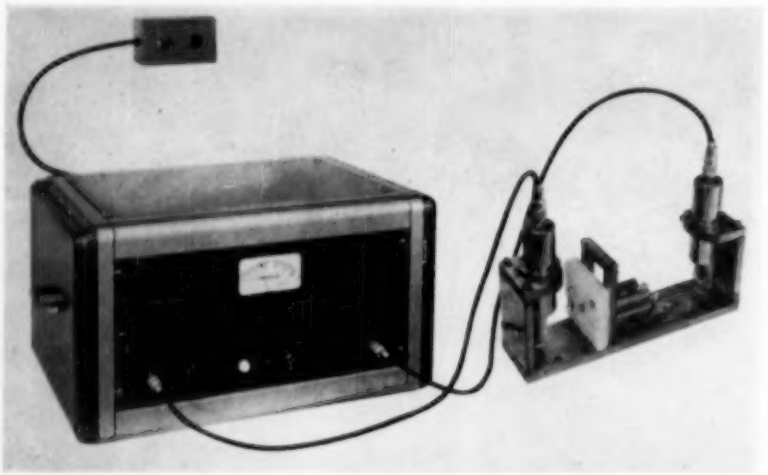

Branson Instruments, Inc., 430 Fairfield Avenue, Stamford, Conn., have developed a new ultrasonic-transmission testing device for detecting laminar flaws in metals and plastics, "cupping" in bolts, brazing defects and similar discontinuities. The SONORAY is most useful for high-production testing of parts having uniform geometry. The part to be tested is immersed in a liquid and continuous ultrasonic waves are passed through it from the transmitting transducer to the receiving transducer. Discontinuities in the part reduce the amount of energy picked up by the receiving transducer and this reduction, in turn, is registered in a meter reading. Acceptance and rejection limits are established by first testing a statistically appropriate sample quantity of parts, and subjecting those indicating a low transmission factor to a destructive test or sectioning, and visual inspection. The sensitivity of a relay is then adjusted according to the predetermined acceptable quality level. Indicating lights controlled by the relay are provided for rapid differentiation of good and bad parts in high-production testing. Automatic-handling accessories, recorders, etc. can be attached without modification.

★ ★ ★

Lightning Calculator Co., Box 6192, St. Petersburg Beach 6, Fla., has added to its line of Quality Control Demonstration Aids, a device with a dual purpose of simulating control charts and distribution shifts. The training aid may be purchased as a unit or each of the simulators may be purchased separately. The Distribution Shift Simulator contains distribution pattern cutouts of various shapes, normal, near normal, wide, etc.; limit rods consisting of seven colored dowels with magnetized ends for easy attachment; scale holder for insertion of suitable paper scale for measurement parameter; white background for clearly showing off the distribution cut-out and dowel rods; and a sliding track for distribution patterns. By sliding the patterns back and forth it becomes possible to illustrate the relation of various limits to the rejection area. The Control Chart Simulator consists of a Plotting Unit of 13 horizontal rods, with sliding beads; a background scale of vertical ordinates; scale holders for insertion of a paper scale for measurement parameter and for time ordinates; plot beads for plotting on each rod; a bead retainer and a control-limit simulator to represent spec. center and control limits. Demonstration control charts of various types are easily constructed with this Simulator. Price of the combination simulators is $100.00. The Control Chart Simulator only sells for $70.00, and the Distribution Shift Simulator only for $50.00.

★ ★ ★

New Literature

Technical Marketing Associates, Inc., Concord, Mass., have prepared a booklet entitled "How to Write Technical Reports and Still Maintain Your Sanity." It was originally prepared for engineers of a leading military defense laboratory, and is now being used by several commercial research laboratories and college English departments. Because of the demand for the publication, the company has had to charge for printing and mailing costs. The price schedule is as follows:

1 to 99 copies	$0.25 each
100 to 500 copies	0.20 each
Over 500 copies	0.15 each

Beckman Bulletin #17 is available from the Beckman Division, Beckman Instruments, Inc., Fullerton, Calif. Featured in the bulletin are a radio frequency leak detector, automatic spectrophotometers which speed laboratory analysis and a new PH electrode. Other Beckman Division literature is listed.

POSITIONS AVAILABLE

Address all replies to box number references to: American Society for Quality Control Room 6197 Plankinton Bldg., 161 W. Wisconsin Ave., Milwaukee, Wis.

RESEARCH STATISTICIAN

Chemist or Chemical Engineer with statistical background, recent graduate or some experience, for experimental design on chemical research and chemical engineering problems. Expanded research facility of large chemical manufacturer, East Coast. Send resume and salary expected, Box 12X1 to the above address.

Paper manufacturer with multi-plan operation has opening for recent engineering graduate in its staff Quality Control organization. It is desirable that this man have quality control or statistical training. More important, however, is that this man be a self-starter with initiative and ability to work with others. Location: Western Massachusetts. Please reply to Box 12X2 at the above address.

The newly formed Electronic Components Department of the General Electric Co. needs men with quality control experience for its rapidly expanding quality control operation. Prefer a degree and/or experience in chemical engineering, electronics, industrial engineering or similar science. Our products are new and different, and are a challenge to fresh quality control approaches. Please furnish a resume to personal data and experience stating salary desired to Carl O. Steinnagel, Relations, Communications and Training, General Electric Co., Electronic Components Dept., W. Genessee Rd., Auburn, N. Y.

FUND CONTRIBUTIONS

The Society wishes to acknowledge and thank the St. Louis Section for its contributions of $50 to each of the Shewhart Medal and Brumbaugh Award Funds.

The Society also wishes to thank the Milwaukee Section for its contribution of $100.00 to the Saddoris Award Fund. This contribution was originally returned to the Section since individual sections may not contribute to the fund. At Milwaukee's suggestion, the contribution has been accepted since it was made prior to the time of the renaming of the Presidential Award for Section Management and since the Section's purpose was to contribute to whatever memorial was established for Mr. Saddoris.

CORRECTION NOTICE

An error occurred in Table III of Harry T. Schwan's article, "Practical Linear Programming Applications" which appeared in the March issue. The Table appeared at the top of page 6. In the column marked "M1-M3" the figure 75,500 should have been 75,000.

Our apologies to author and readers.

OF ESPECIAL IMPORTANCE: DIRECTOR OF CONTROL LABORATORIES FOR ONE OF THE OLDEST MANUFACTURING CHEMISTS

In its largest sense this is a new requirement. It is a Management job with complete responsibility. It can only be filled, however, by an outstanding chemist whose education AND experience includes statistical analysis, and who possesses the qualities of leadership and decision required of an executive. To receive consideration, the applicant will have had experience in quality control for both raw materials and finished products. He will have an understanding of all the processes employed in drug and pharmaceutical production and used or devised control methods for them. He will have a record of progressive advancement to the position he now occupies as Chief Chemist, Director of Quality Control, Manager-Control Department or similar—or he may be that individual's executive assistant. During this period he may have received professional recognition through active participation in a national scientific society's division relating to his field. The successful candidate will already be earning a five-figure salary and in his thirties or early forties.

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To evaluate present inspection techniques employed in such areas as Machine Shop, Mechanical and Electrical Assembly, Receiving Inspection and the Processing Departments. Must evaluate Production Planning, operation call-outs, and assign classification of defects to each operation.

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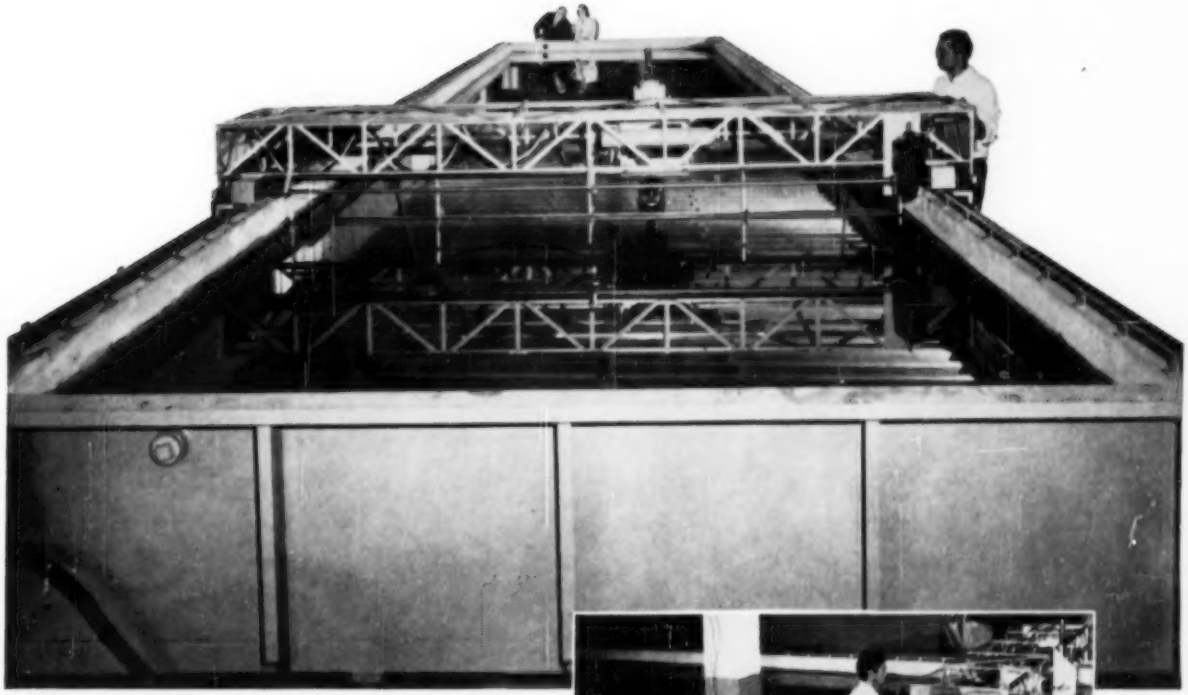

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